MODERN
Machine Shop

April, 1950

Gould & Eberhardt select "OK" Angle Shell End Mill for machining Meehanite GB Shaper Ram Castings

Job facts

BEVEL (10" Cutter) { Depth. 5/16". Feed. 9" per min. / Depth. 1/32". Feed. 7" per min.

FLAT TOP (5" End Mill) { Roughing cut: Depth. 3/8". Feed. 9" per min. / Finishing cut: Depth. 1/32". Feed. 25" per min.

TIME (70" Cut)

Roughing Angle.	8 min.	Roughing Flat Top.	8 min.	TOTAL
Finishing Angle.	10 min.	Finishing Flat Top.	3 min.	29 min.
	18 min.		11 min.	

Photograph shows a 10" OK Bevel End Mill with forged Rexalloy Blades, mounted on a Cincinnati Hydrotel vertical milling machine. Picture was taken half way through the 72" roughing cut. Eight minutes is fast time for a cut 5/16" deep.

OK Inserted Blade Milling Cutters look good on all types of jobs. Blades can be repeatedly set out and reground, adding long hours to their life. In addition, you get a better finish, faster time, more accuracy. Investigate what they will do for you.

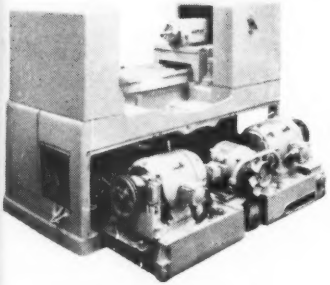
THE OK TOOL COMPANY

Division Williams and Hussey Machine Company, Inc.

WILTON, New Hampshire

easy to get at

Roll-out power units save service inspection time and expense on *new* Heald Bore-Matics



The pump, tank, and motor unit, as shown above, is separate from the machine base, and can be easily drawn out for inspection and servicing. With the entire assembly out in the open, all parts are easy to get at — easy to keep clean.

The separate power unit offers still another important advantage, too. It isolates motor vibration from the machine, for maximum precision and better finish.

You know how important it is to have a machine that will cut down-time to the minimum. And that's exactly what you get in all Heald precision finishing machines. For Heald has attacked the service inspection problem from two angles. First, by building into every machine the inherent quality that means longer service with minimum attention. And second, by making all parts easily accessible. The result — less time out for servicing, more production time on the job.

Remember — when it comes to precision finishing, it pays to come to Heald.

HEALD

THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

Branch Offices: Chicago • Cleveland • Dayton • Detroit • Indianapolis • Lansing • New York

VOLUME 22 NUMBER 11
APRIL, 1950

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MODERN Machine Shop

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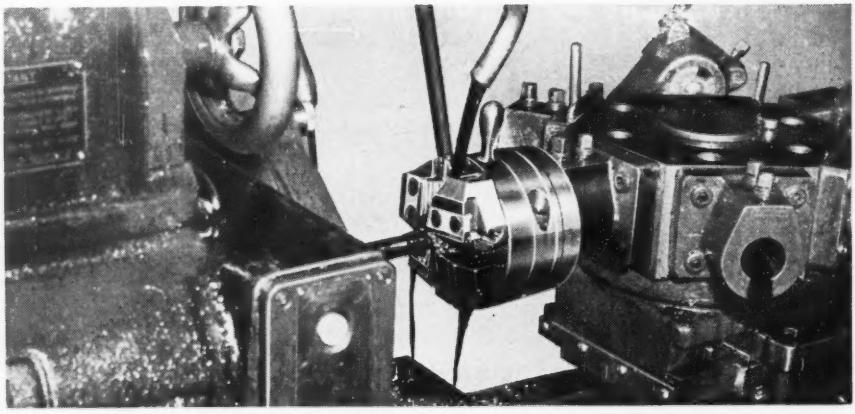
THREADING COSTS CUT BY OVER 75%



Time Study records of a large aviation equipment company show still another job where LANDMATIC Heads have effected large savings.

Here, a 1¼" LANDMATIC Head with Leadscrew is cutting a ⅝-6 Acme thread on a Stabilizer Screw used by a light aircraft manufacturer. The thread is held to the close tolerance of ± .001 between the P.D. of the thread and the O.D. of the screw, for a full thread length of 5⅜" on cold-drawn piston stock, Spec. #AISI, B1112.

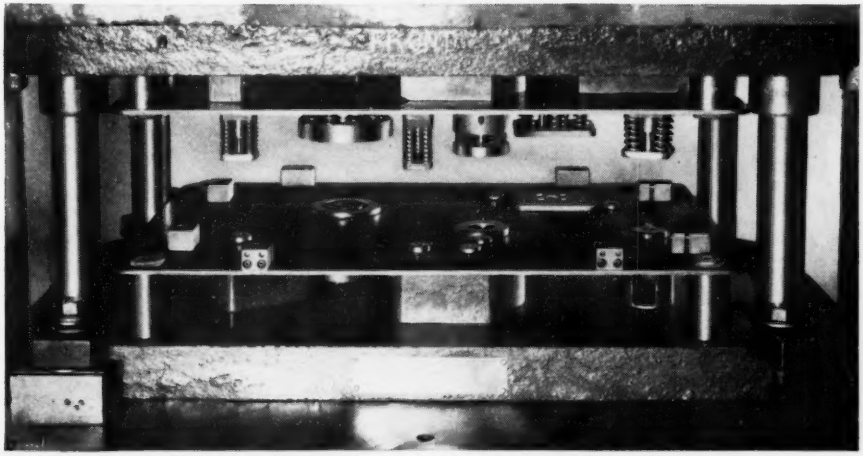
Former methods required two passes to produce the finished thread—one roughing and one finishing cut. The thread is now cut in one pass in .192 at a spindle speed of 230 R.P.M. Approximately 400 pieces are cut between chaser grinds. Hand fitting with the mating nut in assembly, previously necessary, has been eliminated. Total cost savings in all operations are in excess of 75%.

LANDMATIC Heads are stationary with self-opening action designed primarily for turret lathes, featuring an unusually-large oversize capacity. Write for Bulletins F-80 and F-90.

LANDIS Machine COMPANY

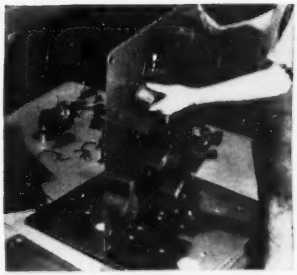
WAYNESBORO • PENNSYLVANIA

Magnetic PERFORATING DIES



Magnetic Perforating Die set-up in small inclinable punch press.

NEW and FAST METHOD for Perforating Sheet Metal



Die retainers complete with bushings being inserted in die template.

SAVE PRESS DOWN TIME. Approximately 15 minutes required to change from punching one subject of say 20 holes to a different 20 hole arrangement. Whistler Magnetic Perforating Dies *increase* press production.

HOLD CLOSE TOLERANCES. Hole centers may be held to .0005" accuracy or as close as can be jig bored.

GREATER PUNCH AND DIE LIFE. Concentricity of punch and die assured thus giving uniform clearance around punch, increasing punch and die life.

SAVE FLOOR SPACE. Die storage cut to a minimum because only the 2 locating templets are stored... all that is required to duplicate the set-up.

REDUCE DIE COSTS. Whistler Magnetic Perforating Punch and Die units are used repeatedly for different hole arrangements. When completing one job, remove all units from templet and put them into service on the next different set-up. Combine any number of hole sizes and shapes. Punch and die costs are amortized over continued re-use in many jobs.

Write for Catalog...

Whistler Magnetic Perforating Punches and Dies have *proven* their cost-cutting advantages in many prominent plants. The catalog shows how. Send for it today.

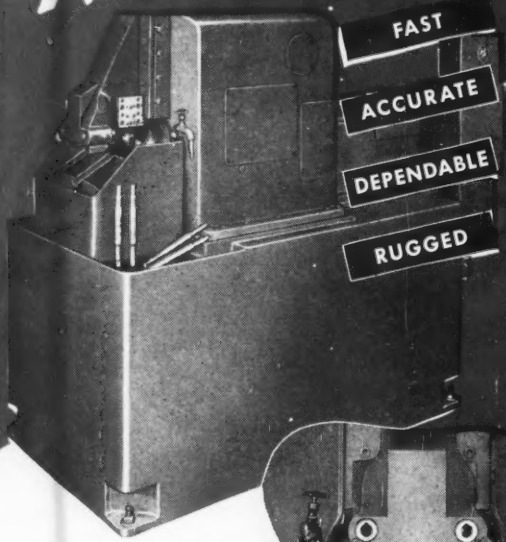
S. B. WHISTLER & SONS, Inc.

740 Military Road, Buffalo 17, N. Y.

Also manufacturers of a complete line of drawing, forming, blanking and progressive dies to special requirements.

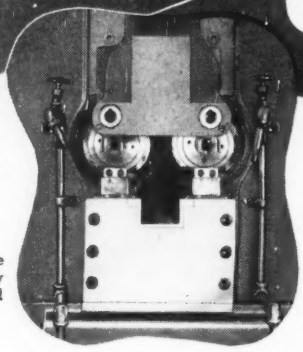
First Public Showing of Whistler Magnetic Dies at Work—Booth 832—ASTE Convention—April 10-14—Philadelphia

The New Motch & Merryweather Automatic

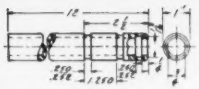


The new M. & M. Automatic is available as a bar-feed or hopper-loaded machine.

Illustrated at right are spindles and heavy duty forming slides with guard removed.

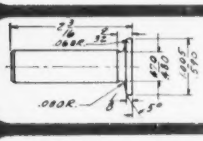


STUDY THESE TYPICAL JOBS

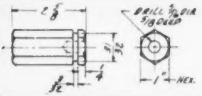


Operation: Form grooves, chamfer O. D., face and form internal groove.
Material: Seamless tubing—mild steel 1/8" wall.
Production: 1100 pcs/hr. @ 100% eff.

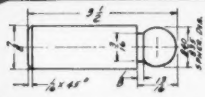
Operation: Form snap ring grooves, grease groove, chamfer and drill.
Material: AISI-1015.
Production: 720 pcs/hr. @ 100% eff.



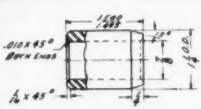
Operation: Face head, form back of head and neck.
Material: SAE 5120.
Production: 720 pcs/hr. @ 100% eff.



Operation: Form chamfer, groove, drill and cut off.
Material: Aluminum F.M.
Production: 680 pcs/hr. @ 100% eff.



Operation: Form diameter, groove, chamfer and cut off.
Material: Aluminum F.M.
Production: 510 pcs/hr. @ 100% eff.



Operation: Form chamfer both ends O. D. Break edges I. D. and cut off.
Material: Seamless tubing—SAE 1020.
Production: 600 pcs/hr. @ 100 eff.

The drawings above can only hint at the possibilities of the new, proven Motch & Merryweather Automatic. Study them closely, compare with your own requirements, and then

WRITE US FOR FULL INFORMATION, describing your needs.

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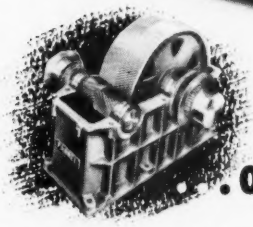

. . . of Farrel® Speed Reducers

On page 5 of Farrel's latest bulletin on speed reducers, you will find a description of the *Gear with a Backbone*—the type of gear used in Farrel units.

In addition to describing these gears and explaining the advantages resulting from their precision generation by the famous Farrel-Sykes method, this bulletin also contains specifications, horsepower rating tables, overhung load capacities, dimensions and weights of single, double and triple reduction units.

If you buy or specify speed reducers, you should have a copy of this informative manual. Just ask for Bulletin 449—no cost, no obligation.

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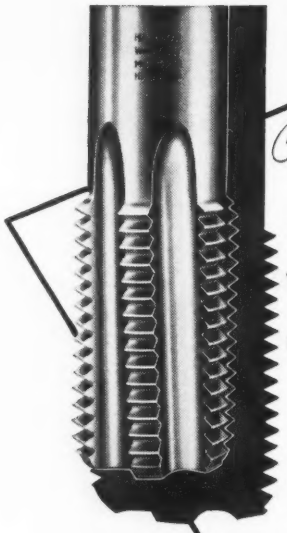
FB-584



Maybe

THEY SHOULDN'T BE

SO EXPENDABLE

It seems to be a foregone conclusion in many plants that taps in the screw machine sizes are *expected* to break . . . and *expected* to wear out . . . quickly.

Well, there's a big difference in taps and also in the meaning of "quickly."

Here at Hanson-Whitney we know that taps are expendable to a degree . . . but the degree depends upon many factors such as tap selection, type of operation, work material and lubrication.

If you are having troubles with tap breakage and tap wear we suggest that you do two things, 1) Write for our engineering suggestions. 2) Specify Hanson-Whitney taps . . . finished after hardening. There are no finer taps made.

HANSON-WHITNEY MACHINE CO. HARTFORD 2, CONN.
Division of Whitney-Hanson Industries, Inc.

For practical recommendations submit your problems to Hanson-Whitney engineers

Hanson Whitney

PIONEERS OF FINISHED TAPS

1HW49

Ever stretch a backbone to hold 500 ribs?

Courtesy Rittling Corp.

You need plenty of spinal column in making this convector radiator section. Over 500 ribs, or fins, are attached to its tubular backbone—and the attaching, while ingenious, is tough on the tube.

Assembly is made by dropping the fins into a slotted jig, inserting the tube, and ramming terrific pressure through the tube to expand it into a jam fit with the fins. In the process the tube O.D. between fins is enlarged by thirty thousandths—actually creating a groove to firmly hold each fin.

Where does the fabricator find tubing to fill this unusual service demand? Right from Frasse. Frasse has supplied the seamless tube for this requirement since its beginning in 1946. And in 4 years of this grueling application—in tens of thousands of feet put to this exacting test—*there has never been a single failure.*

If it's trouble-free quality you like, you'll like the tubing Frasse ships you. And when you work from Frasse stocks, you've plenty to work with. For Frasse warehouses stock over 1200 tube sizes alone—from 3/32" to 24" O.D., in wall thickness from .022" to 1". And for technical assistance, you'll find Frasse engineers always ready to help analyse the profit potential of tubing in your product. Call Peter A. FRASSE and Co., Inc., *17 Grand St., New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Ave., Philadelphia 29, Pa. (Baldwin 9-9900) • 50 Exchange St., Buffalo 3, N.Y. (Washington 2000) • Jersey City • Syracuse • Hartford • Rochester • Baltimore*

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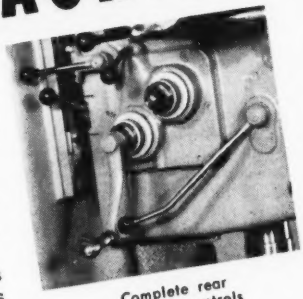
b) Complete rear operating controls; for safety and convenience of operation when the work obscures the cutter

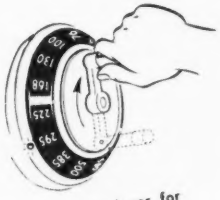
c) Sixteen spindle speeds, 25 to 1500 rpm; cover all practical requirements for milling various metals with modern cutters

d) Sixteen feeds, 1/4" to 30" per minute; instantly and easily selected by means of a single crank type control

e) Heavy spindle (No. 50 Series taper hole) with center bearing



Complete rear operating controls



Single lever for selecting speeds

Whether you're interested in additional equipment or replacement machines within the 7½ hp classification, your best bet is CINCINNATI No. 3MI. You'll like its amazing cutting ability, its full No. 3 range. Plain and universal styles available. Complete data in catalog M-1700.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

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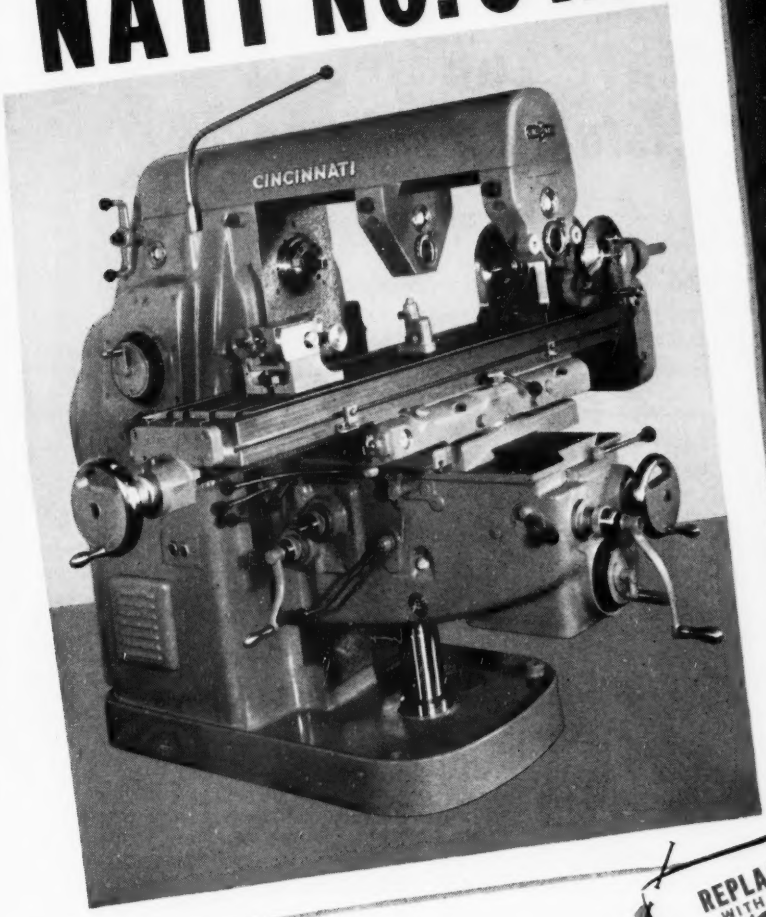
METAL WORKING SHOPS
NATI No. 3 MI



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Distortion due to improper tightening during assembly often exceeds machine tolerances allowed in the component parts, leading to product failure in the field.

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Tool Life — Lower Tool Cost
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Write for Bulletin SW-18.

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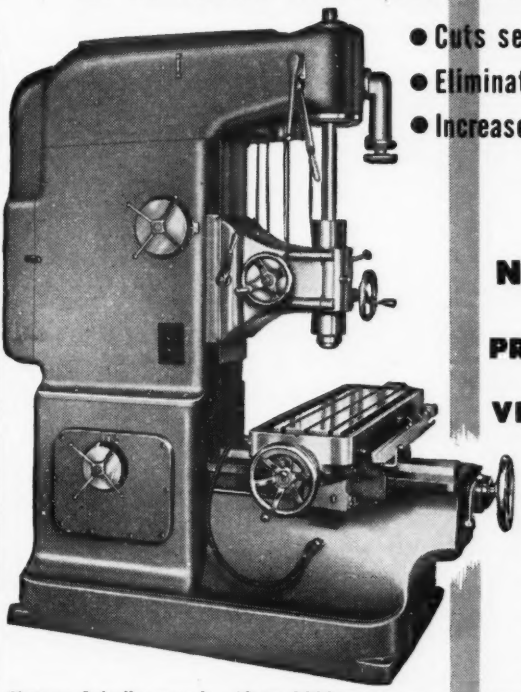
P.A. STURTEVANT CO.
ADDISON QUALITY ILLINOIS

1 machine that does the work of 2!



- Cuts setup time in half
- Eliminates work transfers
- Increases output, reduces costs

KNIGHT NO. 50 FOR PRECISION BORING AND VERTICAL MILLING

- Handles an extreme range of difficult precision work usually done on two or more machines
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- Complete selection of spindle and table speeds and feeds
- Rugged, rigid bed-type construction for positive accuracy on heaviest work
- All-gear 7½ H.P. drive—Plenty of power for large, tough jobs
- Simple, convenient controls—easy setup—clear vision—all reduce job time

Sixteen Spindle speeds, 40 to 2000 r.p.m.—9 Spindle feeds, .005″ to .010″—100″ table traverse per minute in both directions—16 Table feeds, 5/16″ to 20″ per minute

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MORE GOODS for MORE PEOPLE at LOWER COST

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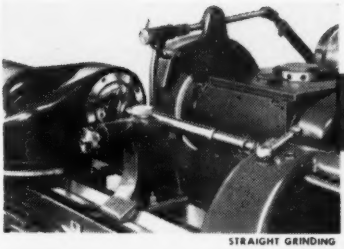
Precision Grinders

12" Diameter Swing
28" Between Centers
12" Diameter Grinding Wheel
3,250 Pounds Net Weight
51"x105" Floor Space
A.C. Operation



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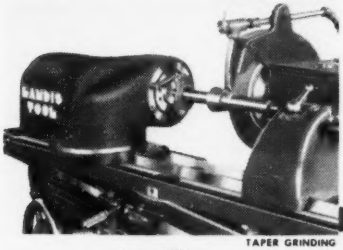
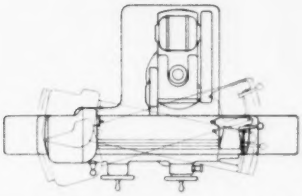
the NEW LANDIS TOOL Grindwell

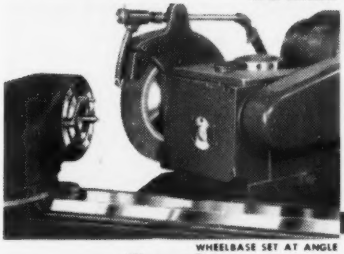
a low cost, general purpose, Universal Grinder



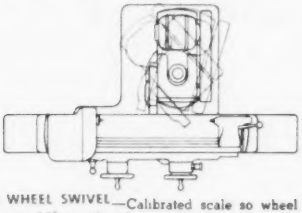
TAPER GRINDING



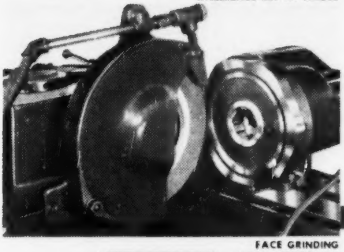
WORK TABLE SWIVEL—Calibrated scale at end of table for setting angle of taper grinding up to 24° included angle or 5" per foot. Center scale graduated for turning table 90° either direction.



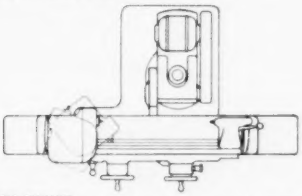
WHEELBASE SET AT ANGLE



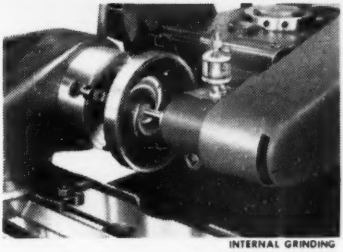
GRINDING WHEEL SWIVEL—Calibrated scale so wheel head can be set for angle up to 90° in either direction to eliminate work piece interference or dress angle on face of wheel.



FACE GRINDING



HEADSTOCK SWIVEL—Calibrated scale so angle up to 90° in either direction can be set for face grinding and tapered external or internal grinding of chucked work pieces.



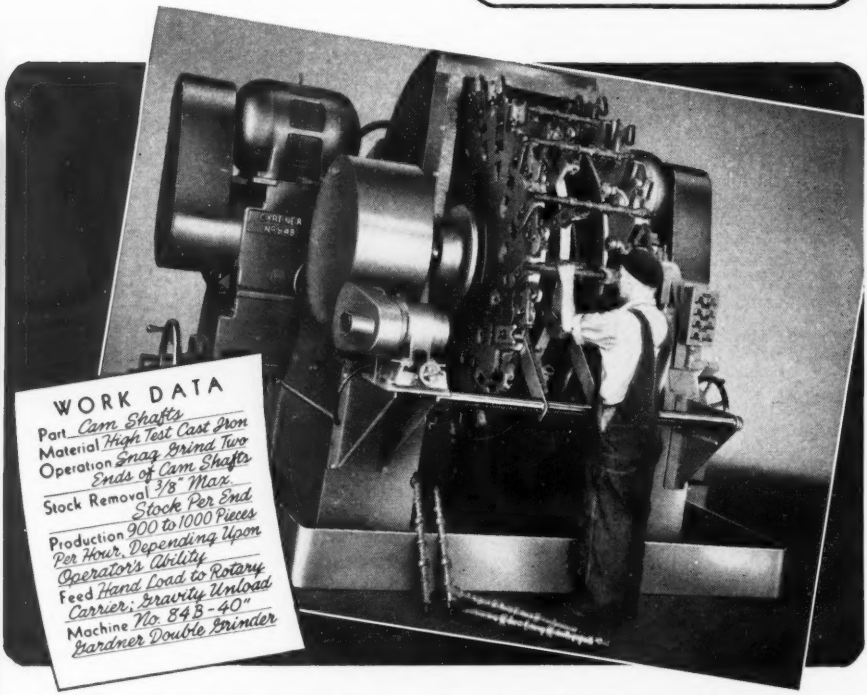
INTERNAL GRINDING

For detailed features and specifications, request Bulletin 549, illustrated.

LANDIS TOOL COMPANY
WAYNESBORO, PENNA.

Double GARDNER-GRINDING

_ makes unit costs come down!


WORK DATA
Part Cam Shafts
Material High Test Cast Iron
Operation Snag Grind Two Ends of Cam Shafts
Stock Removal 3/8" Max. Stock Per End
Production 900 to 1000 Pieces Per Hour, Depending Upon Operator's Ability
Feed Hand Load to Rotary Carrier; Gravity Unload
Machine No. 84B-40" Gardner Double Grinder

Snag-Grinding Two Ends of Cam Shafts, at 900 to 1,000 Pieces Per Hour!

GARDNER-GRIND *Your Flat Surfaces*

LOWER unit costs with higher production . . . that's the job this No. 84B-40" Gardner Double Grinder is doing in one automotive plant. Check the accompanying Work Data Sheet. Perhaps you have a similar grinding operation which could be done quicker and better with a Gardner Double Grinder. Let us show you how you can "meet the market" with lower unit costs in your parts production.

Write for our DOUBLE GRINDING Bulletin!

GARDNER MACHINE COMPANY

428 EAST GARDNER STREET . . . . BELOIT, WISCONSIN, U S A.

Particular Craftsmen the world over depend on Jarvis Rotary Files to do their most precise filing. Equally effective on steel or bronze, magnesium or aluminum, plastic or wood composition, many-shaped Jarvis Rotary Files come with coarse, standard, fine, super-fine, diamond or herringbone flutings — specials for special jobs. Rigid quality control and most advanced production methods make these ground-from-the-solid files better than ever before. Used with Jarvis Flexible Shaft Machines, they make a perfect combination for dependable, quality production. For free literature write to The Charles L. Jarvis Company, Middletown, Connecticut.

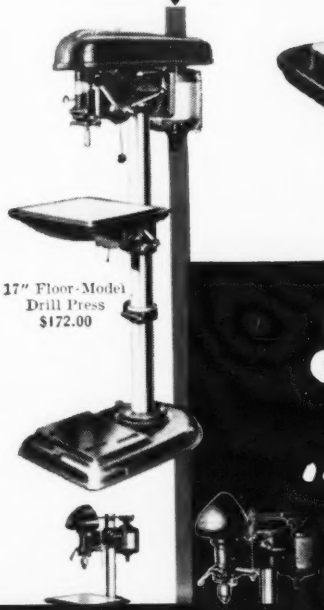
Jarvis POWER TOOLS

TAPPING ATTACHMENTS • TECNI-TAPS and DIES • ROTARY FILES
FLEXIBLE SHAFTS and MACHINES • QUICK CHANGE CHUCKS and COLLETS

THE CHARLES L. JARVIS CO., MIDDLETOWN IN CONNECTICUT

17" Multiple-Spindle (8) Drill Press - $1579.00

DELTA
MILWAUKEE
®



17" Floor-Model Drill Press $172.00

Single-spindle drill presses ...or batteries a block long!

DELTA® the most complete line

14" Floor-Model Drill Press $109.00

14" Bench-Model Drill Press $74.00

14" Super-Hi® Drill Press $151.50

17" Floor-Model Power-Feed Drill Press $267.00

17" Bench-Model Drill Press $204.50

Motor and switch extra. Prices subject to change without notice.

TALK about selection! There are 144 different drill presses in the big Delta line. Every one is tops when it comes to drilling — and versatile enough to do over 36 different additional jobs, besides!

Naturally you can find the exact machine your job calls for in such a complete line — with the right number of spindles, the right chuck capacity, the right speed — *and at the right cost!*

There are 14" and 17" models . . . floor and bench types . . . single spindles . . . multiple-spindle batteries . . . individual heads for special set-ups . . . power-feed and foot-feed machines . . . high-speed, super-sensitive models. Speeds range from 80 to 12,000 r.p.m. . . . capacities from .023" diameter to ¾" in cast iron. And, as you know, Delta quality is always the best.

What's more, you get this *same* wide selection in 42 other machines besides drill presses. Altogether, they make *Delta* the industry's most complete line of metalworking and woodworking machines. It's the only line with complete accessories to make every tool do more jobs — and often save you an investment in other machines.

That's why it pays to look to Delta first — for the right machine to do your job right. Send coupon for catalogs and bulletins on the entire Delta line.

POWER TOOL DIVISION

Rockwell

Manufacturing Company

MILWAUKEE 1, WISCONSIN

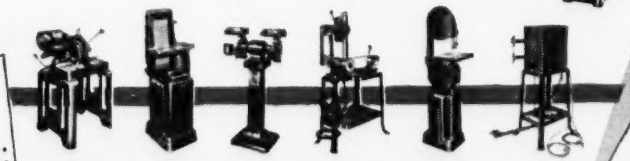
DELTA • MULTIPLEX • CRESCENT • HOMECRAFT

Sold only through authorized dealers. Easy time-payments!

Look for the name of your Delta dealer under "Tools" in the classified section of your telephone directory.

Tear out coupon and mail today!

Plus a complete selection of:



3 Cut-Off Machines · 2 Abrasive Finishers · 5 Grinders · Deburring Machine · 3 Band Saws · 3 Welders

6 Circular Saws . . . 4 Jointers . . . Scroll Saw . . . 4 Radial Arm Saws . . . 2 Shapers . . . 2 Saw-Jointer Combinations . . . Mortiser . . . Lathe . . . 2 Buffing Machines . . . 2 Planers.

53 Machines — 246 Varieties

Power Tool Division
ROCKWELL MANUFACTURING CO.
602D E. Vienna Ave., Milwaukee 1, Wis.

Send me free catalogs and bulletins on the complete Delta line.

Name .....

Title .....

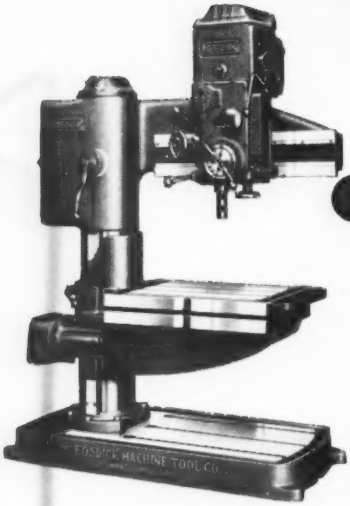
Company .....

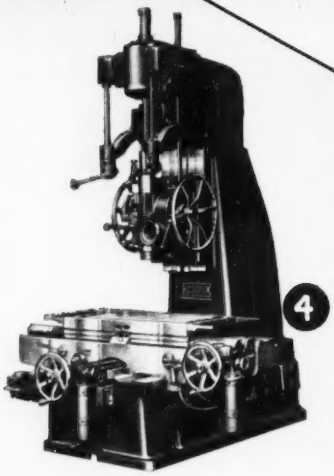
Address .....

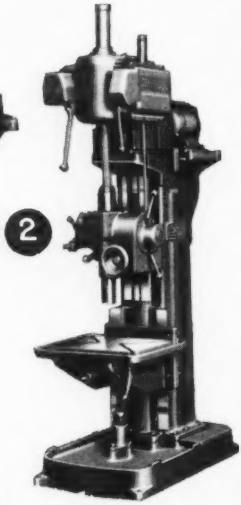
City ..... (.....) State .....

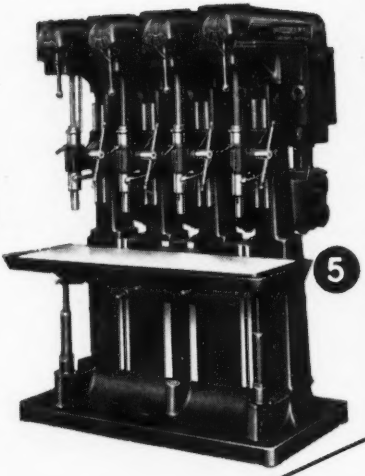
M-47

Presenting







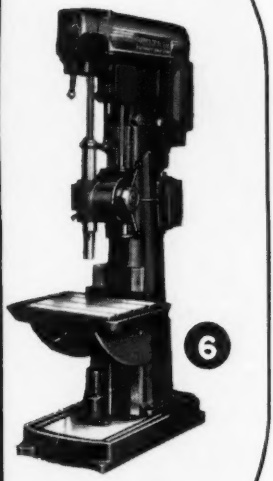


THE

a modern line of PRECISION MACHINE TOOLS...

by

FOSDICK



Included in this modern line of Fosdick Machine tools are machines for drilling—reaming—boring—facing and similar operations. Fosdick Jig Borers have gained wide acceptance for precision operations, in tool rooms and tool and die shops. Hydraulic Radial Drills are available in types and sizes to meet your most exacting requirements. The new Sensitive Radials, which combine the advantages of both the Sensitive and Radial Drills, provide a high speed sensitive machine for radial work.

Also included in this line are Sensitive Drills in single and multiple spindles up to six. For high production a single purpose Sensitive with one speed and one feed has been added. Standard Sensitive Drills are equipped with six or nine speeds. Medium and heavy duty Upright Drills are obtainable in both box and round column types. Special production features can be added to any one of the Fosdick Machines.

Consult a Fosdick Representative or write for bulletin for detailed information.

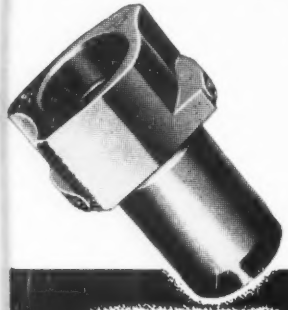
1. The new Fosdick Sensitive Radial built in 3' and 4' sizes.
2. Improved Hydraulic Radial built in 11" to 19" columns.
3. Fosdick improved Jig Borer.
4. Fosdick Economax Upright Drill furnished with box and round columns.
5. Fosdick four spindle High Speed Drill.
6. New 21" B.M. Fosdick Upright Drill.

FOSDICK MACHINE TOOL COMPANY
CINCINNATI 23, OHIO

Revere REVOLUTIONARY

DRILL BUSHINGS

NEW ☆ RUGGED ☆ ECONOMICAL



In 1919 W. R. Fisher offered the first standard drill bushings for sale. In 1934 he succeeded in getting the A.S.A. standards adopted by the trade, then in 1949 Mr. Fisher developed the new revolutionary method of making drill bushings. The results of 30 years of continuous bushing experience will further benefit the trade by lower cost, higher quality and new services.

QUALITY

Revere Revolutionary Drill Bushings wearing surface equal to tungsten carbide.

LOW COST

Revere Revolutionary Drill Bushings wearing surface assembled in a die cast body.

SERVICE

Revere Revolutionary Drill Bushings assembled from large stocks near you.

All the accuracy of the solid type bushing with a wearing surface of high grade material .030 to .050 thick assembled in a die cast body.

Revere Fisher ENGINEERING CO.

LEXINGTON, MICHIGAN

TURNS REJECTS INTO OK'S

Cone wheel smooths out die marks 200% faster

IN grinding die marks from the inside of pressure tanks, this manufacturer was using straight type 4500 R.P.M. grinders with 6″x 2″x ⅜″ vitrified wheels. The wheels cut grooves into the tank on either side of the die marks, causing failures under test.

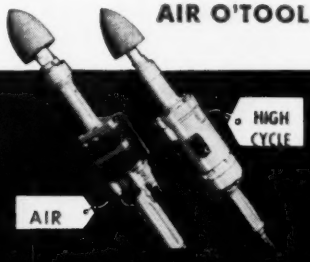
When called in, the Rotor Application Engineer recommended 8500 R.P.M. Rotor Air Grinders with 2¼″ x 3½″ x ⅜″ resinoid bond cone wheel, round nose. Result:

Output increased 200% because the round nose-cone wheel could be held on the die marks without cutting into the tank wall . . . and because of the faster cutting of the resinoid wheel and the higher speed.

Now the inspector says, "OK," every time.

How about *your* portable tool problems? We'd like to tackle them!

AIR O'TOOL

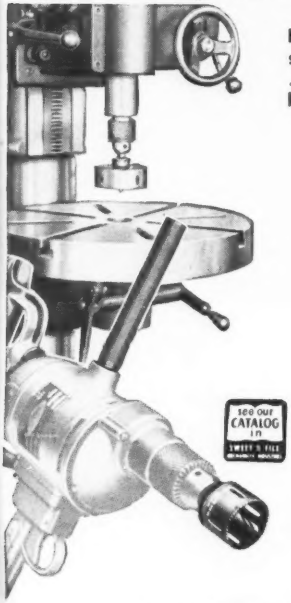


THE ROTOR TOOL CO.
CLEVELAND, OHIO

Cut...

LARGE HOLES

. . . thru any machineable material up to 1 1/8 INCHES thick!



Here is a premium tool which makes it possible to saw holes in one short operation . . . large holes which heretofore had to be laboriously machined "a-chip-at-a-time."

MARVEL High-Speed-Edge Hole Saws have strength to withstand the terrific peripheral strains of heavy duty operation in lathes, drill presses or portable power tools. They have a high speed steel cutting edge which is electrically welded to a tough, alloy steel body, high speed steel pilot drills, heavy hexagonal shanked arbors and sufficient set for deep drilling. They are self-aligning, as the larger diameter saws float on their arbors and are driven by double drive pins. They will saw round holes accurately in any machineable material.

MARVEL High Speed-Edge Hole Saws come in 35 sizes, from 5/8" to 4 1/2". They are carried in stock by leading industrial distributors

WRITE FOR BULLETIN ST-49

"MARVEL" has Always had the edge!

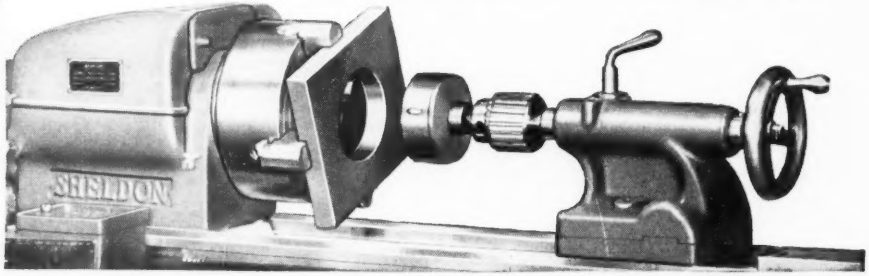
MARVEL *Metal Cutting* **SAWS**

Better Machines—Better Blades

ARMSTRONG-BLUM MFG. CO.

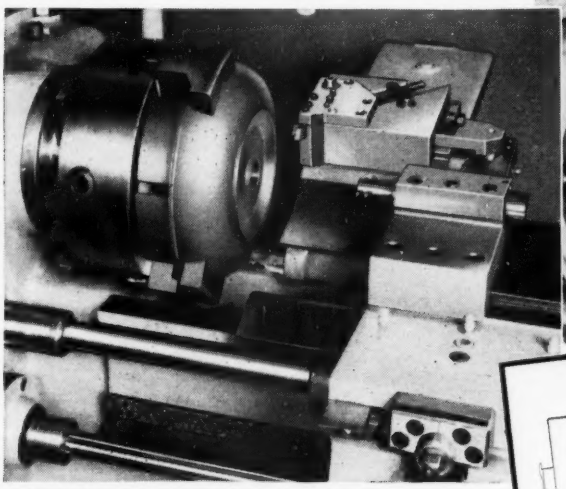
"The Hack Saw People"

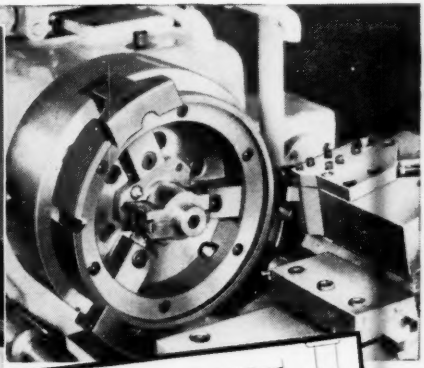
5700 Bloomingdale Avenue **Chicago 39, U. S. A.**

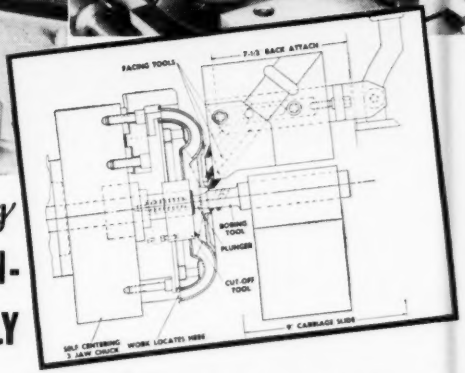


MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK







INGENIOUS TOOLING ON Lo-swing LATHE MACHINES TORQUE CONVERTER COUPLING AUTOMATICALLY

Problem: To bore and face closed end of Torque Converter Coupling, and to cut off inside flange, in a single automatic operation.

Solution: The Model LR Automatic Lo-swing Lathe was selected for this job and special tooling developed. The upper left illustration shows the work in position, held by a 3-jaw universal chuck. Facing Tools can be seen on the Back Attachment and the Boring Bar, with two cutters, on the Front Carriage Slide.

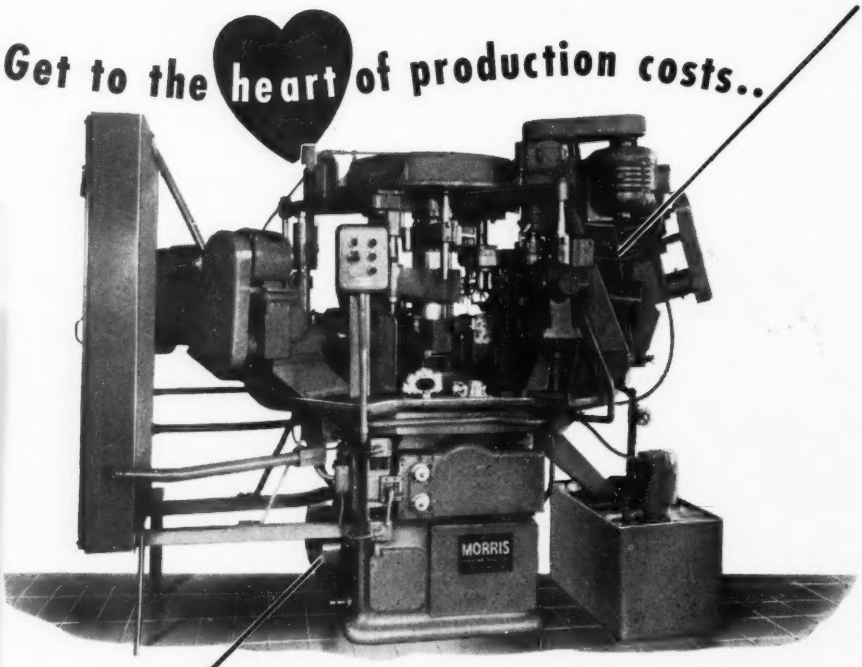
A Cutting-off Tool is visible in the upper right illustration and is shown also in the tooling layout. The unusual location and mounting of this Cutting-off Tool permits the removal of a ring of waste metal from the inside of the coupling, thus eliminating a second operation and a second chucking of the part. It is a non-revolving Tool, mounted on a heavy bar which runs through a hollow headstock spindle. Its longitudinal movement, or feed, is obtained through a cam driven by the regular feed cycle of the machine.

A plunger, having a mushroom head, catches the Cut-off ring of metal and prevents damage to the Tool prior to removal of the work. Facing and Boring Tools operate simultaneously after the Cutting-off Tool has parted the inside flange. The work is a steel stamping, and Tantung and Carbide Tools are used. Let Seneca Falls help you with your turning and tooling problems.

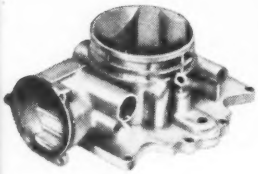
SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH Lo-swing

Get to the heart of production costs..



with MORRIS MOR-SPEED Production Machines



Each Morris Production Machine is designed to pay for itself and return dividends too, in higher production of precisely identical parts.

The 6-Station, Vertical Center Column Machine illustrated automatically indexes to drill, face and tap holes in either a right hand or left hand carburetor air horn. Fifteen operations are performed in a two cycle operation with a completed part machined on each index of the machine. Twenty - two spindles produce 300 pieces per hour at 80% efficiency. The ability to perform machining operations on either right or left hand carburetor air horns is another example of Morris-designed versatility and cost cutting productivity.

THE MORRIS MACHINE TOOL COMPANY

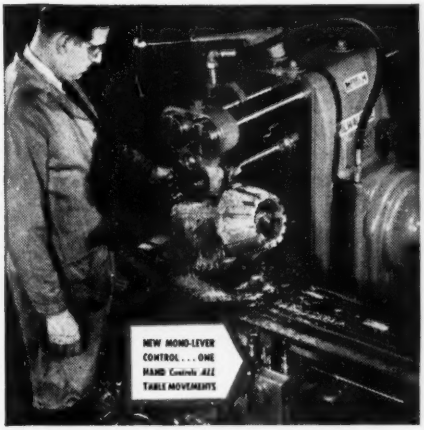
"A better product at less cost— with MORRIS ENGINEERED PRODUCTION"

Builders of MOR-SPEED Line

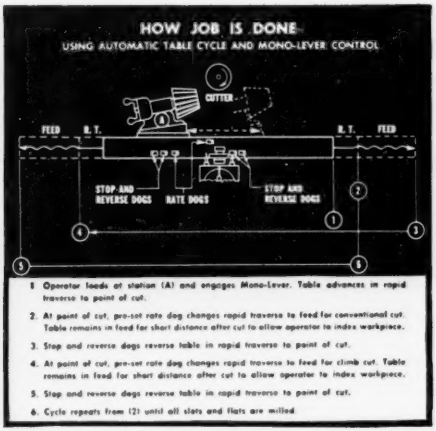
933 HARRIET STREET CINCINNATI 3, OHIO

Looking for savings?

96% INCREASE IN PRODUCTION SHOWN ON THIS JOB



Here's modern profit-making in action! This new Kearney & Trecker Model 2H Plain Automatic Cycle milling machine with Mono-Lever control increased production on this complex cast aluminum part 96%.


HOW JOB IS DONE
USING AUTOMATIC TABLE CYCLE AND MONO-LEVER CONTROL
CUTTER
FEED
R. T.
R. T.
FEED
STOP AND REVERSE DOGS
RATE DOGS
STOP AND REVERSE DOGS
1. Operator loads at station (A) and engages Mono-Lever. Table advances on rapid traverse to point of cut.
2. At point of cut, pre-set rate dog changes rapid traverse to feed for conventional cut. Table remains in feed for short distance after cut to allow operator to index workpiece.
3. Stop and reverse dogs reverse table in rapid traverse to point of cut.
4. At point of cut, pre-set rate dog changes rapid traverse to feed for climb cut. Table remains in feed for short distance after cut to allow operator to index workpiece.
5. Stop and reverse dogs reverse table in rapid traverse to point of cut.
6. Cycle repeats from (2) until all slots and flats are milled.

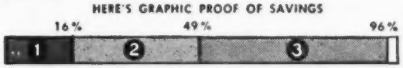
Here's how this big production increase was accomplished. Table cycle was preset to allow for indexing. Backlash eliminated by adjustable table feed screw nut — climb and conventional cuts were done equally well.

COMPARE

Production by old method.

Production gain using a Kearney & Trecker Milling Machine with Mono-Lever Control and Automatic Table Cycle.

HERE'S GRAPHIC PROOF OF SAVINGS



1. 16%—The minimum over-all savings reported from any job when done on a Kearney & Trecker Milling Machine with Mono-Lever Control and Automatic Table Cycle.
2. 16%-49% — The *majority* of over-all savings from jobs done on these machines fall here.
3. 49%-96%—Under favorable conditions, several jobs done on these machines have shown savings like this!

YES, here is a positive answer to cutting high shop costs — Kearney & Trecker milling machines with Mono-Lever control and Automatic Table Cycle.

The job data shown here, plus the bar graph, at the left, shows what other users have done AND *what you can expect* . . . savings of 16% to 96% on most milling operations.

Contact us or our nearest representative today. Get the facts on how Kearney & Trecker milling machines with Mono-Lever control and Automatic Table Cycle can cut your costs, increase your savings. No obligation. Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

How are You Finishing Parts like These?

Take Advantage of the New NORTON TUMBLING SERVICE!

NOW we're prepared to help you test for yourself the advantages of this fast tumbling abrasive and this economical finishing process—without charge or obligation.

If you haven't installed tumbling barrels, and if you aren't familiar with this Norton abrasive product, send us sample parts (unfinished, finished as you'd like them, or required surface finish specifications). We'll tumble the unfinished parts for you—determine the best tumbling cycle—and will furnish you with this worthwhile information, which will help to prove how this product and process can save you time and money.

The chart at the right illustrates the basic elements included in this modern finishing process. If you'd like further details, send for a free copy of the Norton booklet, "Precision Tumbling with ALUNDUM Abrasive," or contact your Norton abrasive engineer or distributor.

NORTON COMPANY • WORCESTER 6, MASS.

Distributors In All Principal Cities

NORTON ABRASIVES

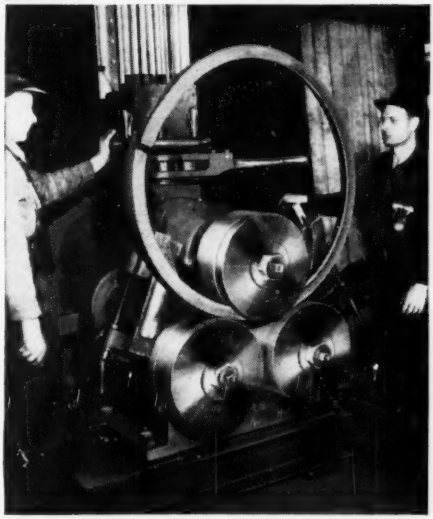
G-216A

MEASURE YOUR BENDING PROFITS BY Production Capacity

with "Buffalo"

BENDING ROLLS

It will pay you to consider the many useful circular items you can produce commercially with "Buffalo" Bending Rolls. They represent the cheapest, quickest and easiest method of making arcs, circles and spirals from various metal shapes and sections. Roll changing time is reduced to a minimum. WRITE FOR BULLETIN 3344-A for the correct Roll for light sections and BULLETIN 352-B for the heavier models.



These machines will bend rings from the following standard sections:

1. Angles, leg-out
2. Angles, leg-in
3. Beams on flanges
4. Channels, flanges-in or out
5. Flats on edge
6. Flats on flat
7. Rounds
8. Squares
9. Copper tubes
10. Copper tubes
11. Standard St. pipe
12. X heavy pipe
13. XX heavy pipe

And many other special sections.

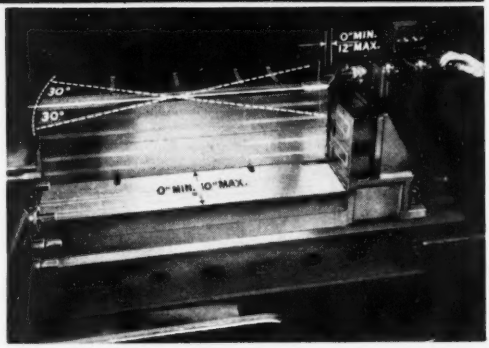
BUFFALO FORGE COMPANY

388 BROADWAY **BUFFALO, N. Y.**

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

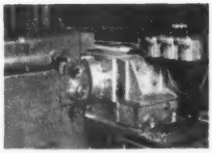
How To Save Time
IN YOUR MILLING DEPARTMENT WITH A SUNDSTRAND GENERAL PURPOSE MAGNETIC FIXTURE

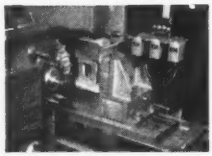
Here's a new work-holding fixture for general purpose milling work. It saves on miscellaneous milling jobs by eliminating time losses for adjusting mechanical clamps and the cost of special jigs or fixtures. It is a complete unit with Sundstrand Magnetic Chucks mounted on an adjustable fixture. Chucks are quickly positioned as required by the size of work piece and easily adjusted for angular milling cuts. If you have miscellaneous milling jobs requiring frequent changeover from one part or cut to another, it will pay you to



Sundstrand Magnetic Fixture showing adjustments. Note clamping is performed by merely throwing switch.

investigate the savings possible with this new magnetic holding fixture. Sundstrand Magnetic Chucks are operated with an automatic demagnetizing control. There is no tube in rectifier to burn out. Generally, the input of the control unit is 110 volt A.C., which is rectified to 6 volt D.C., which in turn energizes the chuck. The low voltage eliminates possibility of shock to the operator, and no heat is produced to affect accuracy. Controls with inputs other than 110 volt A.C. can be furnished when required.





TYPICAL SET-UPS

These three set-ups illustrate only three of many different parts that are being run over one general purpose magnetic fixture in the manufacturer's plant.

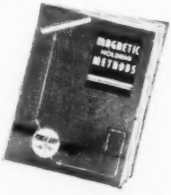
•

Top — Milling steel tool blocks. Parts are run in lots of one to ten and are machined all over.

Center — Milling three steel cam bars simultaneously. Bars are 33⅝" long x 2½" wide and 1¼" thick and are milled all over in six operations.

Bottom — Milling cast iron motor bracket slide. Part is held for eight different cuts with same fixture.

FREE
Additional Data



Complete information on Sundstrand Magnetic Chucks Will be sent on request. Ask for bulletin 595M.

See this magnetic work-holding fixture demonstrated in booth No. 907 at the A.S.T.E. Show April 10 to 14 in Philadelphia.

SUNDSTRAND MAGNETIC POWER-GRIP CHUCKS

SUNDSTRAND MAGNETIC PRODUCTS CO.
Division of Sundstrand Machine Tool Co.
1830 - 9th St. • ROCKFORD, ILLINOIS

Ball Sanders
Bench Grinders
Drills
Drill Stands
Feeder Hammers
Grinders
Electric Hammers
Impact Wrenches
Nibbler
Nut Setters
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Saws
Screw Drivers
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PIONEERS IN THE FIELD

Thor HAS THE

LARGEST SELECTION

PORTABLE POWER

SCREWDRIVERS

AND NUT SETTERS

Thor invented the portable power screwdriver. Thor—the pioneer—has tooled up hundreds of assembly lines with power screwdrivers. Thor engineers the widest selection of attachments for driving all types of screws, nuts and bolts. Today, Thor electric screwdrivers, for example, are more widely used than ever because of their power, handling ease and other cost-saving features. Call today for a free demonstration. Independent Pneumatic Tool Co., Aurora, Ill.

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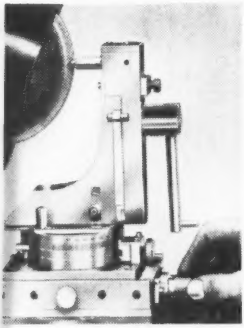
Catalog E-2

BUY IT from your DISTRIBUTOR

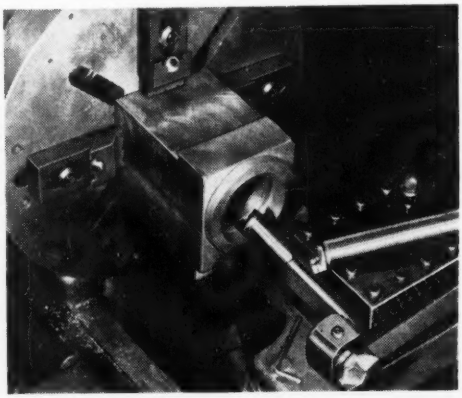
Thor TOOLS

ELECTRIC • PNEUMATIC

Machine Shop TIME SAVERS *by* J & S



• **J & S "Fluidmotion" RADII AND ANGLE DRESSERS** save time! Dress entire angle-radius-angle profile in one continuous motion—with one set-up. Save wheel cost, too—.0001" accuracy means less material removed. Other features: automatic centering, dustproof and chatterless, hardened stainless steel construction, dress up to 24" wheel diameters.



• **J & S All-Purpose JAW CLAMPS** grip all sizes and shapes of workpieces inward and downward to face plate. No draw bar necessary. One adjusting screw facilitates controlled centering—eliminates secondary operations. Jaws allow overall machining of work over 3/8" high. Photo shows heavy work-piece held securely through boring and facing operation.

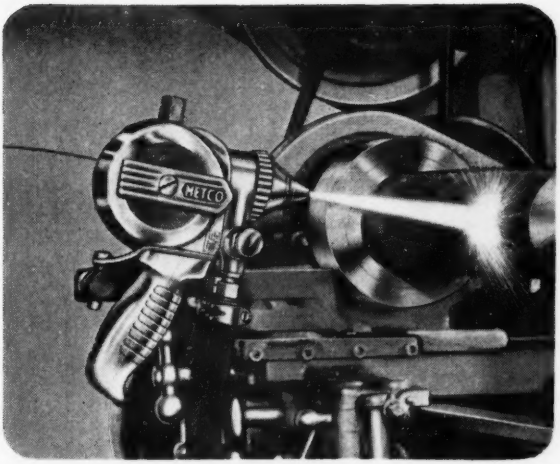
• **J & S KOALA CIRCULAR CUTTING TOOLS.** New or re-sharpened cutters can be inserted in same shank without re-setting machine or stops, as each accurately repeats original set-up position. Easy to re-grind, low priced, simple. Major uses: Internal—boring, facing, threading, forming; External—turning, facing, forming, threading. Photo shows typical deep boring, boring, and internal facing operation, external facing and turning. 12" boring bar removed to show carbide head after 41 re-grinds.

Write for further information

SEE J & S Machine Shop TIME SAVERS at the TOOL SHOW in Philadelphia... **BOOTH No. 954 ★** Accurate form grinding service to customer's specifications.

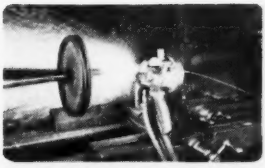
J&S TOOL CO., INC.

475 MAIN STREET
E. ORANGE, N. J.



now a really low-cost metallizing installation...

with the *new* Metco L-Gun



Metallizing damaged journals on turbine shaft

Building up worn brake-drum

Metallizing protective coating on steel plate

New, low, compressed-air requirements . . . only 10 cfm at 40 to 60 psi, already available in many shops, or supplied by inexpensive 3 hp compressor . . . bring metallizing within reach of the small user.

Here's a chance for the smaller maintenance shop to get into profitable metallizing operations like these:

- Save up to 90% of replacement costs on machine repair jobs,
- Do your own hard-facing,
- Apply long-wearing corrosion-resistant coatings to exterior plant structures, tanks and other equipment.

Sprays 23 Different Metallizing Wires—With the new L-Gun you can spray .10, .25, .80 carbon steels, stainless; babbitts, brass, bronze; nickel, aluminum, tin, zinc; special hard-facing materials such as Metco-Weld H, and the new self-bonding spray wire, Sprabond.

It's Versatile—Use the L-Gun machine-mounted or hand-held—it weighs only 4 lb. 2 oz. Do all kinds of metallizing work—shaft and bore build-up with harder, longer wearing metals; build up worn pump plungers, crankshafts, motor shafts; apply corrosion-resistant coatings. There are hundreds of different jobs that are "naturals" for metallizing.

Same High Quality as Other Metco Guns—The low air requirements of the new L-Gun have been achieved without any sacrifice in Metco quality. It embodies new developments in turbine and nozzle construction—is built, like all Metco guns, for rugged, dependable service.

A Real Opportunity for the Smaller Shop—Thousands of large, well-known companies have been metallizing users for many years, not only in maintenance but in production applications on original equipment. Now, with the development of the new L-Gun, and a low cost installation, metallizing is within the reach of even the smallest plant. (We'll be glad to send you the names of some Metco users—large and small.)

Free Bulletin or Shop Demonstration—Send off the coupon for the detailed information Bulletin 55 gives you. Or, better still, ask for a demonstration in your own shop by a Metco Field Engineer. He'll be glad to show you how the new Metco L-Gun works on some job of your own. No obligation, of course.

The following names are the property of Metallizing Engineering Co., Inc.
METCO† • Sprabond • Metco-Weld
†REG. U. S. PAT. OFF.

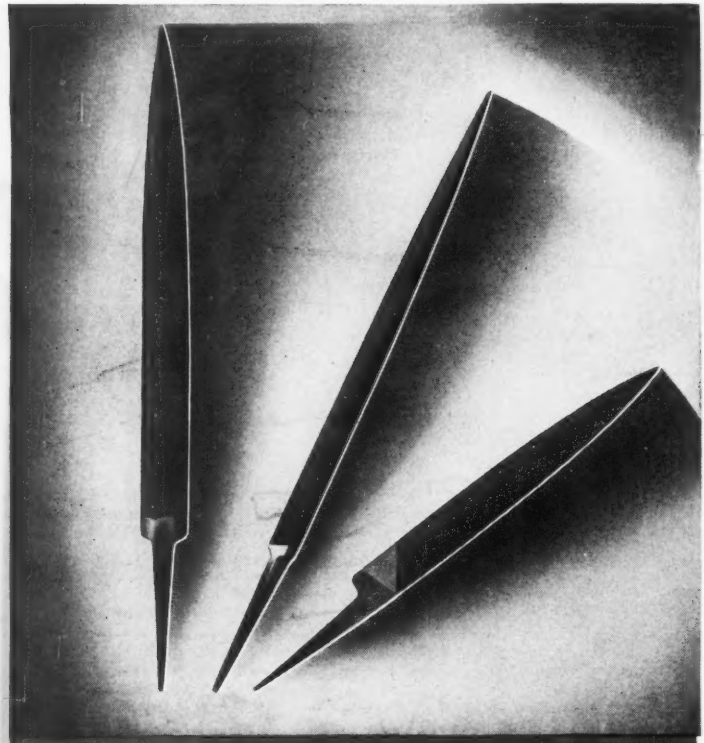
METALLIZING ENGINEERING CO., INC.
38-17 30TH STREET — LONG ISLAND CITY 1, N. Y.

R. J. McWaters
Metallizing Engineering Co., Inc.
38-17 30th St., Long Island City 1, New York

☐ Please send me L-Gun Bulletin 55:
☐ Arrange a free demonstration in my shop:

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____

VISIT OUR BOOTH 1153, A.S.T.E. SHOW, PHILADELPHIA, APRIL 10-14



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Precision

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THE ORIGINAL — YET THE MOST MODERN

1812 P. L. GROBET

CATALOG ON REQUEST

TODAY MORE THAN EVER YOU GET MORE VALUE FOR YOUR MONEY AND YOU GET THE FILE YOU NEED FOR A SPECIFIC PURPOSE—no substitutes, no "near as good." That's why more and more are exclusively using GROBET Chrome Steel SWISS FILES — the oldest name in files, and the undisputed leader where precision is demanded.

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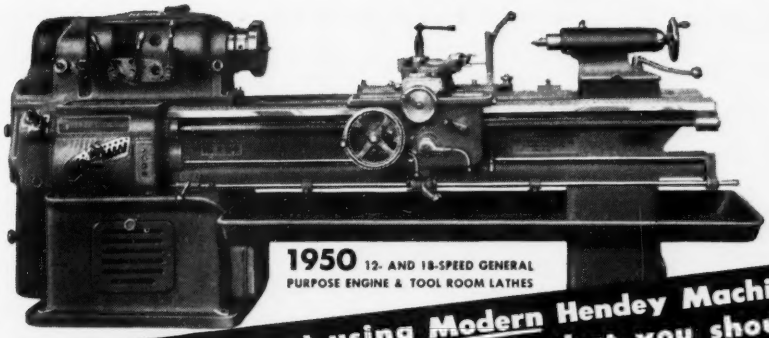
PLANTS: NEW YORK • CHICAGO. **In Canada: 878 Notre Dame W., Montreal**

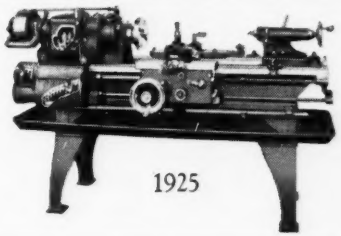


1950 12- AND 18-SPEED GENERAL PURPOSE ENGINE & TOOL ROOM LATHES

. . . If you are not using Modern Hendey Machines you are not earning the profits that you should!

Hendey Engine and Tool Room Lathes have been, and always will be, tops for accuracy. But, are you aware of the many other modern features of the new Hendey line? Like all Hendey Lathes, the 12- and 18-speed now have induction hardened and precision ground bed ways for both carriage and tailstock. Every important unit has fully automatic lubrication. The rear end of the spindle is graduated for indexing when cutting multiple threads, and there are 36 thread and feed changes. The precision, all-geared headstock is powered from a built-in motor in the cabinet leg. Spindle speed ranges from 19-1000 R.P.M. A choice of cam lock or long taper key drive spindle noses. Modern Hendey Tool Room Lathes are available with swings of 9", 12", 14", 16", 18", 20" and 24". Write today for full details and complete specifications.

This 8-speed Hendey Engine Lathe has long been obsoleted by the all-new Hendey 12- and 18-speed lathes. The 8-speed bed is not hardened and precision ground. Maximum spindle speed is only 426 R.P.M. Although a masterpiece of design and construction in its day, the 8-speed has been replaced by progressive manufacturers, because the 12- and 18-speed offer every modern improvement necessary to earn maximum profits.



1925

Continuous, advanced engineering by Hendey is worth watching — and must be watched if you are to earn full profits from your lathes and shapers. For complete particulars and prices, contact your nearest Hendey office.

MODERN Hendey

THE HENDEY MACHINE COMPANY
MAIN OFFICE & PLANT: TORRINGTON, CONN.
BRANCH OFFICES: New York, Chicago, Boston, Detroit, Rochester, Los Angeles, San Francisco
REPRESENTATIVES: Philadelphia, Cleveland, Pittsburgh

SIX-SPINDLE GREENLEE AUTOMATICS

Screw machine department at Parker Appliance Company, Cleveland, Ohio—thirteen Greenlee Six-Spindle Automatics.

TOOLING DATA FOR NUT

Position	TOOL SLIDE	CROSS SLIDE
1	Drill 3/8" hole to approx. 1/2" depth	Rough form O.D. (Breakdown hex)
2.	Drill 19/64" hole through	Finish form O. D. front and back end and chamfer hex.
3.	Flat bottom drill .385 dia. to .532 depth	.....
4.	Step counterbore — ream minor dia. of thread to .338 $^{+.003}_{-.000}$ c'sink 90° x 7/16" dia., ream through hole to .305 $^{+.003}_{-.000}$	.....
5.	Tap 7/16-20 class 3 thread	.....
6.	Ream with step counterbore (accelerated attachment)	Cut-off

Material: 9/16 hex 1335 steel

PRODUCE PRECISION PARKER PRODUCTS

The piece illustrated here is the nut portion of a flare fitting for flexible tubing . . . one of many different types and sizes of precision parts produced on the battery of 13 Greenlee Automatics in the plant of the Parker Appliance Company, Cleveland, Ohio. Parker Appliance makes a wide and varied line of products, including tube fittings, various kinds of standard and special valves, tube assemblies, aircraft specialties, and tube fabricating tools. Greenlee Automatics lend themselves particularly well to this type of operation, where production orders call for a wide range of runs on a large variety of parts in various types of metals.

Learn what Greenlee Automatics can do to reduce production costs in your shop . . . send us prints of typical jobs so that one of our representatives can discuss your problems with you.

PRODUCTION MACHINERY
GREENLEE

GREENLEE BROS. & CO., 1884 Mason Ave., ROCKFORD, ILL.

MULTIPLE-SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES

STRAND

FLEXIBLE SHAFT MACHINES ARE **rugged** AND GIVE TOP PERFORMANCE!...

Investing in equipment demands selecting rugged, long-lasting machines that give top performance. You get both when you buy STRAND Flexible Shaft Equipment. The STRAND line is complete and meets requirements. You'll find available the correct machine with correct H. P., a choice of R. P. M., belt drive or direct drive, varied mountings and many other features you may require.

STRAND equipment enjoys an enviable reputation for quality . . . you can buy it with confidence. It is sold through distributors in major cities.

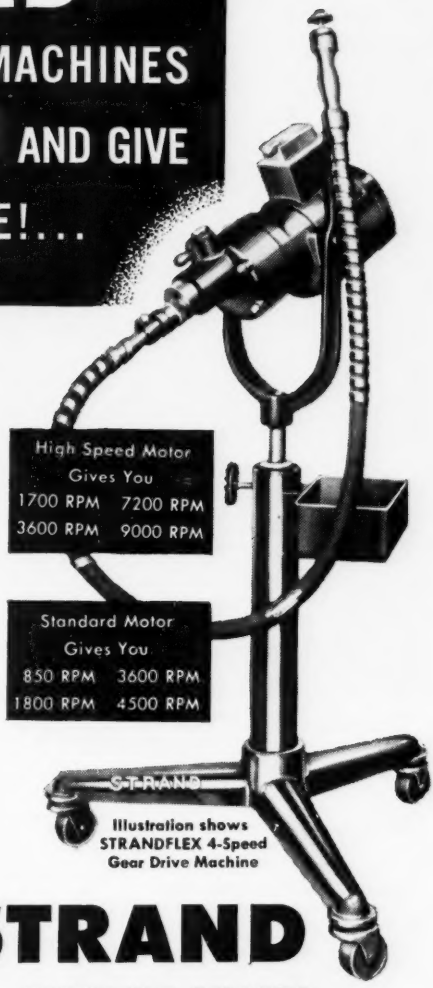


Illustration shows STRANDFLEX 4-Speed Gear Drive Machine

The Balmar Corporation
Woodberry, Baltimore 11, Md.
N. A. STRAND DIVISION
5001 N. Walcott,
Chicago 40

STRAND

FLEXIBLE SHAFTS

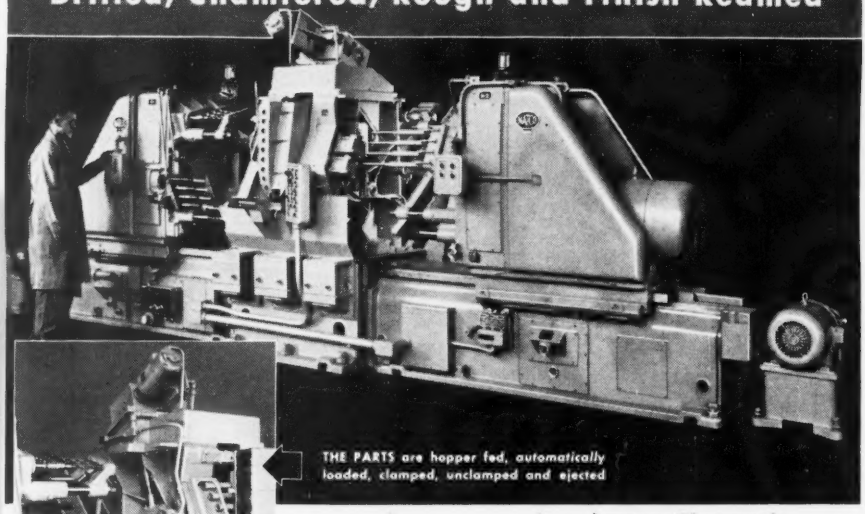
and

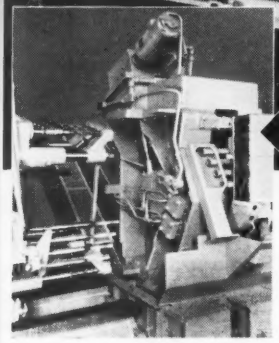
FLEXIBLE SHAFT MACHINES

SALES OFFICES: CHICAGO, BALTIMORE and TULSA

575 PISTON PINS PER HOUR

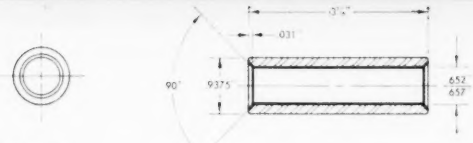
Drilled, Chamfered, Rough and Finish Reamed





THE PARTS are hopper fed, *automatically* loaded, clamped, unclamped and ejected

Chip conveyor attached to rear of fixture pedestal runs in under fixture and carries chips out of machine.



PART: Piston Pins

PRODUCTION: Approximately 575 parts per hour

OPERATIONS:

Position No. 1
Load four parts automatically

Position No. 2
Right and Left Hand Heads
Drill for .652" dia. 1/5 through

Position No. 3
Right and Left Hand Heads
Drill for .652" dia. 2/5 through and chamfer I.D.

Position No. 4
Right Hand Head
Drill for .652" dia. across center
Left Hand Head
Idle

Position No. 5
Right Hand Head
Rough ream through using accelerated spindles
Left Hand Head
Idle

Position No. 6
Right Hand Head
Idle
Left Hand Head
Ream through to .652/.657" dia. using accelerated spindles

Position No. 7
Unload four parts automatically

This is just one of many examples of the way NATCO machines contribute to higher production and lowered costs. Send us your drilling, boring, tapping and facing problems . . . our engineers have the solution.

Write today for NATCO "Success Story" No. 3 and investigate . . .

NATCO DRILLING, BORING, TAPPING AND FACING MACHINES

Dept. MM

NATCO

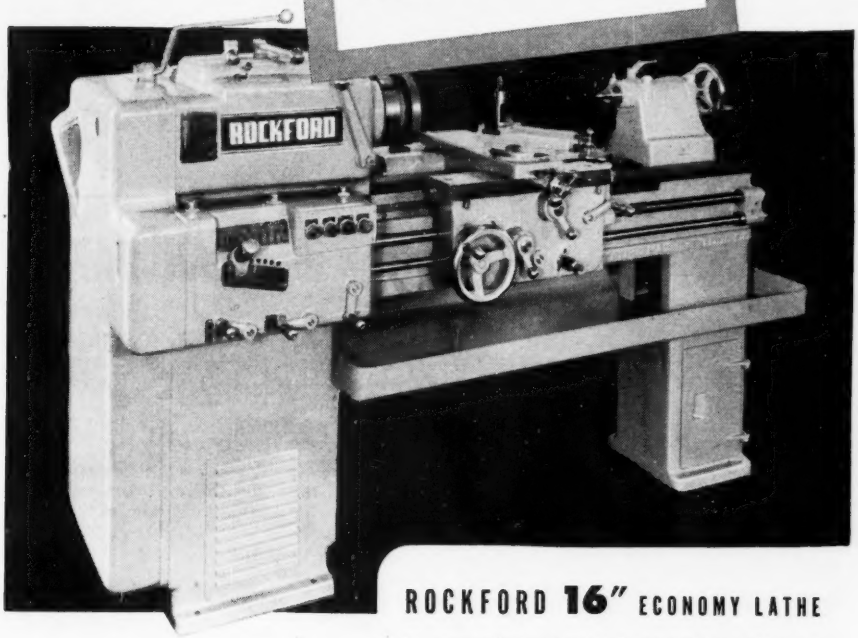
Call a Natco Field Engineer

NATIONAL AUTOMATIC TOOL COMPANY, INC., Richmond, Ind., U. S. A.

Branch Offices: 1809 Engineering Bldg., Chicago • 409 New Center Bldg., Detroit • 1807 Elmwood Ave., Buffalo • 2902 Commerce Bldg., New York City

Consider These Features in a

Medium-Sized Economy-Priced Lathe



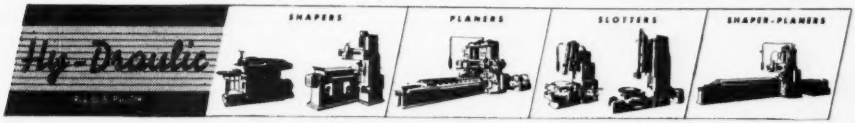
ROCKFORD 16" ECONOMY LATHE

- ★ SEPARATE LEAD AND FEED SCREWS
- ★ ALL GEAR SHAFTS, TIMKEN-MOUNTED
- ★ ALL-GEARED HEAD
- ★ SPEEDS FOR CARBIDE MACHINING
- ★ QUAD-V-BELT MOTOR DRIVE
- ★ 5 HORSE POWER DRIVE MOTOR

Features usually found only in larger, first-line machines are incorporated in Rockford Economy Lathes to provide a general-purpose tool equal to any job within its 16½" actual swing — high production, maintenance or tool room.

Because of this flexibility and its *medium size,* it accommodates a constant variety of work to eliminate any non-productive machine time. Another important feature is its *economy-price* range. Get the complete story on this outstanding production machine from your nearest dealer today. Also, write for a copy of Bulletin E 900-1.

ROCKFORD MACHINE TOOL CO. • ROCKFORD, ILLINOIS



Put it on the BLANCHARD

. . . for stock removal

These side plates, approximately 9″ x 18″, are ground from the rough on a No. 18 Blanchard with 36″ chuck — requiring 1/16″ to 1/8″ stock removal per side.

. . . for close tolerance

These plates are held flat within .003″, parallel to .001″, and to a dimension tolerance of ±.001″. A Blanchard 20C50 Cylindrical Wheel is used.

. . . for speed

Three chuck loads of 5 pieces each, give a production of 30 surfaces per hour. Feed is .020″ per min.

. . . for comparison

A comparison of the Blanchard Method with your present methods may be a pleasant surprise. May we grind some samples for you?

V-348

NO. 18 BLANCHARD SURFACE GRINDER

Send for your free copies of "Work Done on the Blanchard," third edition, and "Art of Blanchard Surface Grinding."

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY
64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

The Men with the Holes in their Heads!

Big holes! Little holes! Deep holes! How can we bore 'em better for less? This may be your problem occasionally. But boring holes at lower cost is the full time problem for Madison engineers. This specialization can save *you* money just as it is doing every day for leading manufacturers. Why not take advantage of the two big things — Madison experience and Madison tools — that can cut cost on your production boring jobs. You're welcome to put another hole in one of our engineers' heads. Ask them to consider your problem and come up with a cost lowering idea. No obligation, of course.

BETTER BORING TOOLS

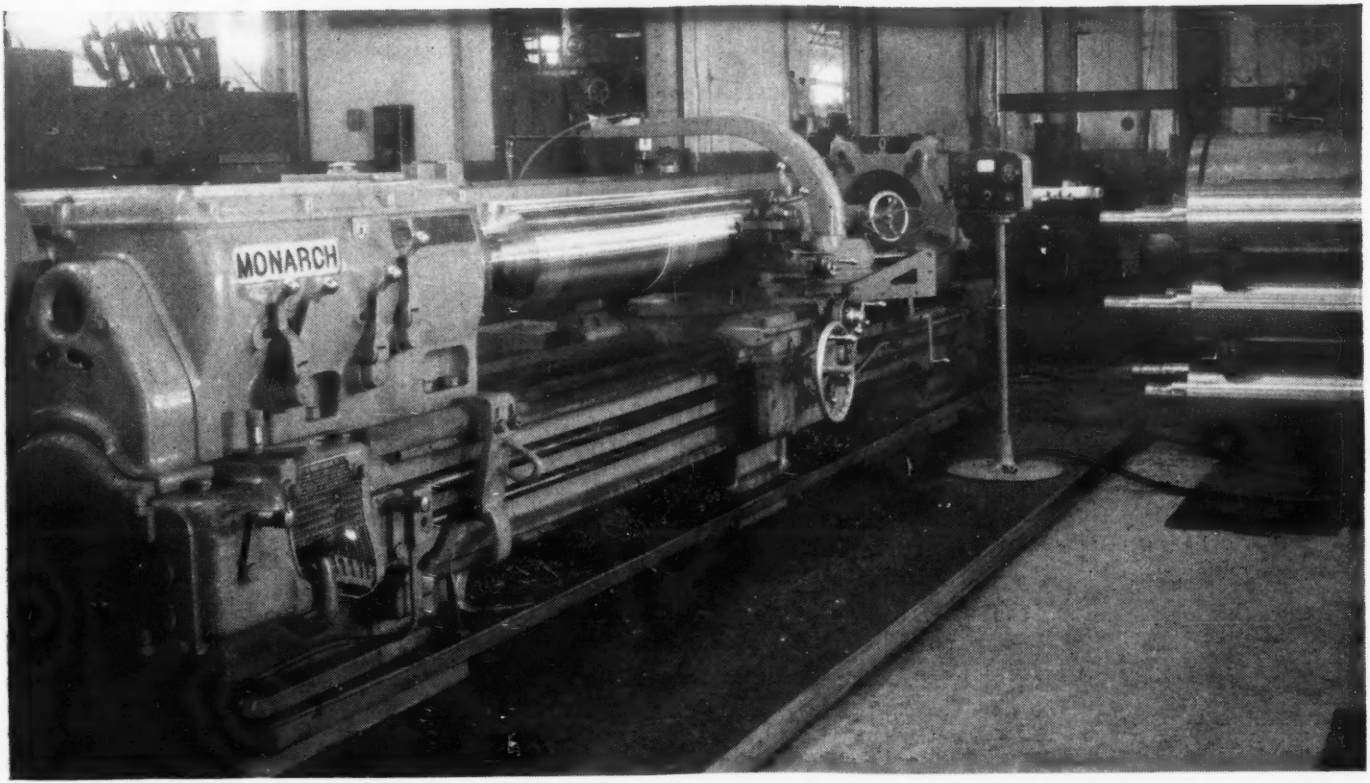
Madison Cutters in Madison Bars . . . the best in boring tools. Madisons give you superior finishes, in most cases cases equalled only by grinding. Tolerances to .0003. Two-bladed cutter that expands to make up for wear in regrinding — also quickly changed from one size to another with no disturbance of the set-up. Cutter floats in the bar — no special floating tool holders needed. More holes per cutter before regrinding and more regrinds per cutter (about 10 times as many as similar tools) . . . and many other original Madison features of design.

MORE BORING EXPERIENCE

For 35 years Madison has concentrated on solving boring problems. With this background of experience applied to your production job, you can count on the best solution to save your money. What's more, you can count on a rcommendation based on a complete line of boring tools.

Write for the information filled Madison Catalog. It is yours for the asking.

MADISON **MADISON** MANUFACTURING COMPANY
DEPT. MM MUSKEGON, MICHIGAN



TURNING TIME REDUCED 80%

Printing Press Rolls Machined in 1½ Hrs. Instead of 7½

One fifth of former time! That's the kind of "*peak production at a profit*" you can expect with Monarch's Air-Gage Tracer-controlled lathes.

But peak production is only part of the story. Accuracy is spelled out with a capital "A". On this job, for example, necks and body of the roll are turned complete, and shoulder spacing on the ends of the roll —88½" apart—is held to + .001" – .000"!

The combination of air-gage accuracy with Packaged Controls and carbide tools permits exact duplication of parts in floor-to-floor times that are second to none.

You can't beat the Air-Gage Tracer's low production costs, either. Single-point turning means lower tool costs, faster set-up times, less machine overhead. And lot size is no limitation: you can trace from a round or a flat template—whether you're turning out two or two thousand parts.

This duplication principle is ideally applicable for stepshafts, contours and taper turning or boring. It brings the speed of automatic lathe operation within reach of every production job. May we show you how it can cut costs in your shop?

JOB FACTS

Part: Printing Press Roll

Material: SAE 1045 Forging

Size: 107" x 14" Diam.

Machine: Monarch 25 x 144 Model N Engine Lathe equipped with Air-Gage Tracer and Packaged Controls

Tooling: Carbide Tipped

Operations: Turn Necks and Body complete

Tolerance: + .001" – .000" between Shoulders

Former Time: 7½ Hours

Monarch Time: 1½ Hours

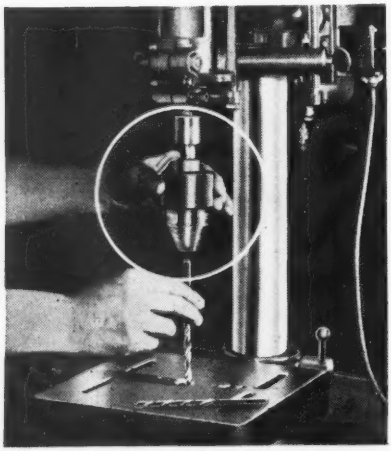
ACCURACY · ECONOMY · LONG LIFE

Monarch TURNING MACHINES

THE MONARCH MACHINE TOOL CO. • SIDNEY, OHIO

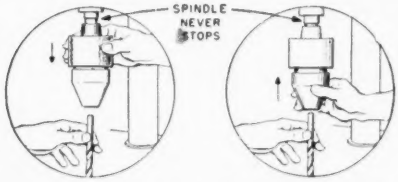
FOR A GOOD TURN *FASTER* – TURN TO MONARCH

Change drills in a second, safely with this Automatic Chuck while spindle is running



AMF Wahlstrom Chucks are rugged tools, proven out in many years of heavy production work. Simple construction assures ease of operation.

HERE'S ALL THERE IS TO CHANGING DRILLS



1. Grip sleeve—pull down —jaws open automatically —drill is released.

2. Insert new drill—push up tapered part—drill is locked in place.

You don't stop the machine to change drills with the AMF WAHLSTROM CHUCK. No keys, collets or wrenches are needed.

That's why Wahlstrom Chucks cut costly minutes in changing tools for drill press work or for spotting, drilling and reaming in boring or milling machines. They'll also save money in lathe work for burring, turning, filing, etc. *One spindle does the work of several.*

Tools last longer, too...smooth, hardened and ground jaws grip tight without chewing into tools. Grip increases with the load.

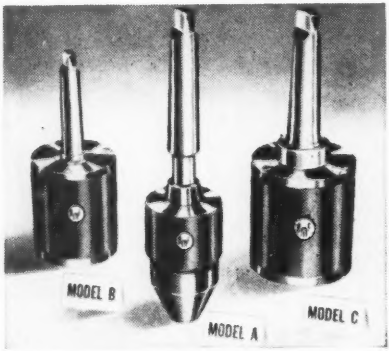
For fast, uninterrupted production, use the quick-change AMF WAHLSTROM CHUCK. It is the only fully automatic drill chuck which holds the widest range of straight shank tools...Model A—1/32" to 1/2"; Model AA—1/64" to 3/8"

See your local distributor or write today for Bulletin 56-1.

WAHLSTROM TOOL DIVISION, AMERICAN MACHINE & FOUNDRY CO.
5502 SECOND AVENUE BROOKLYN 20, N. Y.

See the WAHLSTROM CHUCK at the ASTE Show, Booth No. 659

THESE WAHLSTROM TOOLS CUT COSTS, TOO



Wahlstrom Chucks are available in several size ranges: Model A—1/32" to 1/2"; Model AA—1/64" to 3/8". Model B—15/64" to 1/2"; 3/8" to 3/4"; 17/32" to 1". Model C—Holds any size tool with No. 1, 2, or 3 M.T. Shank.

WAHLSTROM
fully automatic
DRILL CHUCKS
NO KEYS, COLLETS OR WRENCHES

SEE THE AMAZINGLY FAST *PIERCING SPEEDS*

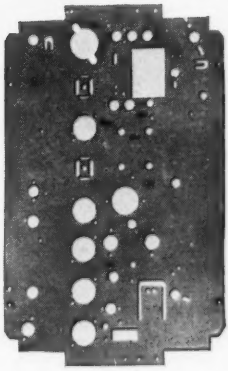
OF THE

WIEDEMANN RA 41-P TURRET PUNCH PRESS

AT THE

A.S.T.E. SHOW

BOOTH 731

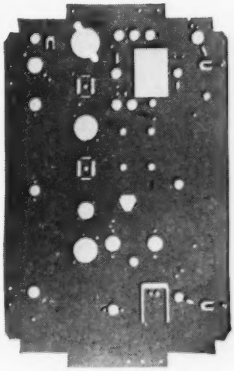


A

PIERCING TIME PER PIECE AS SHOWN

6 min. 28 sec.

Lot of 176
3 Handling Operations
Size 8 7/8" x 14" x .047 steel



B

PIERCING TIME PER PIECE AS SHOWN

5 min. 43 sec.

Lot of 1374
3 Handling Operations
Size 8 7/8" x 14" x .047 steel

Panels A and B are somewhat similar. After producing 176 pieces of panel A, engineering changes were made and incorporated in template changes. Production was completed on Panel B.

LOOK AT THESE *TIMES!*

Then see the RA 41-P in operation

WIEDEMANN MACHINE COMPANY

4219 WISSAHICKON AVE. • PHILADELPHIA 32, PA.

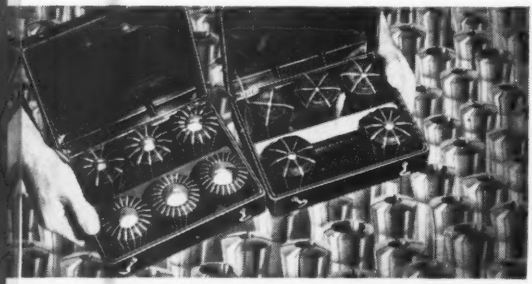
NEW COLLET CHUCK'S GREAT GRIP IMPROVES PERFORMANCE ON YOUR LATHE

Developing the tightest, most accurate grip ever devised in lathe collet equipment, Jacobs' new Spindle Nose Lathe Chuck delivers from two to four times more torque than split steel collet chucks.

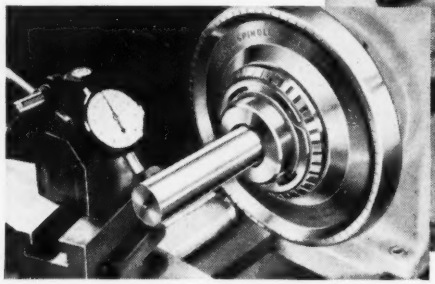
Work cannot slip under the heaviest cuts of the most modern tool room lathes. Despite this ruggedness, the unique design of the collets allows the softest, most fragile materials to be chucked without marring or scratching.

A big order? Certainly . . . but it's filled perfectly by this remarkable new chuck with its unique Rubber-Flex Collet. Multiple alloy steel jaws, hardened and ground, are bonded and mechanically locked together by Hycar synthetic rubber which will not set and is unaffected by heat, coolants or cutting oils. The collet's extra long steel jaws are always parallel to the work and the gripping load is thus distributed over the entire bearing surface. Result: accuracy and gripping power never before obtained in lathe collet chucks.

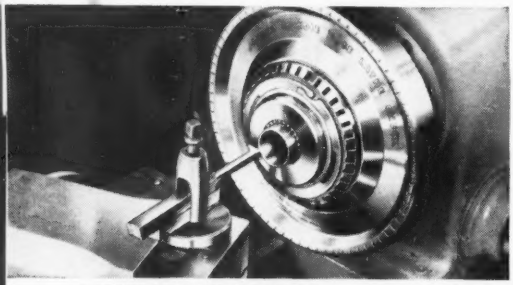
See your Jacobs distributor for bulletin 49-LC describing this new Lathe Collet Chuck.



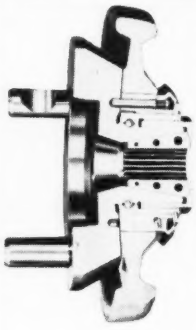
SO FEW DO SO MUCH . . . Each Jacobs Rubber-Flex Collet has a capacity of 1/8". Its grip is constant throughout this range. Only eleven collets are needed to chuck any bar from 1/16" to 1 3/8" diameter . . . contrasted with the 88 split steel collets needed to equal this chucking capacity by 1/64ths!



UNMATCHED ACCURACY . . . This chuck is designed to allow an unusual control of runout — it is the most accurate lathe collet chuck in the world today. The body is made from a single alloy steel forging. All bearing surfaces of the chuck and collets are of alloy steel, hardened and ground.

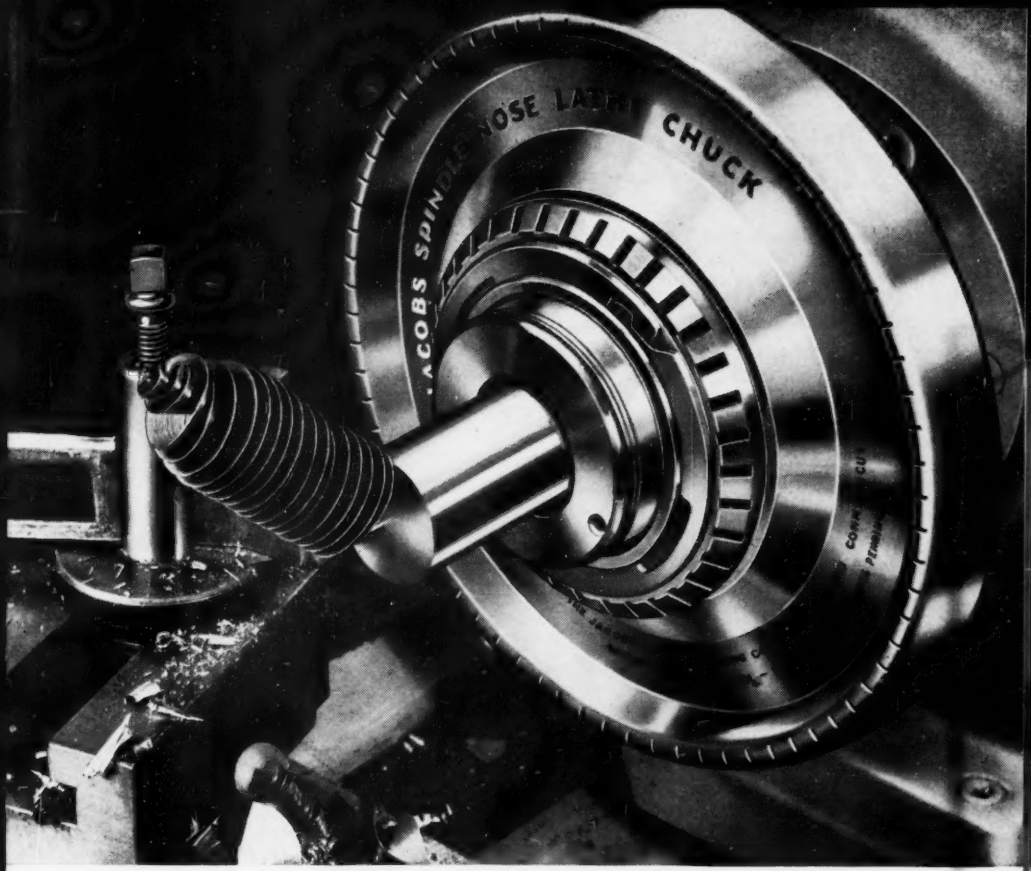


UNIFORM GRIPPING PRESSURE . . . permits the chuck to hold thin-walled tubes, plastics, wood and other fragile materials with no danger of marring or scoring. Grip is so evenly applied around circumference of work, no denting is possible.

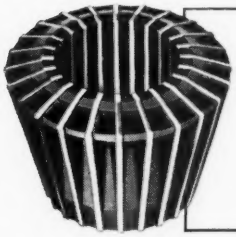


RUGGED CONSTRUCTION

All parts except solid aluminum hand-wheel are of hardened and ground alloy steel. Compact design saves 1½" of overhang compared with other chucks. Impact tightening mechanism opens and closes chuck with great ease.

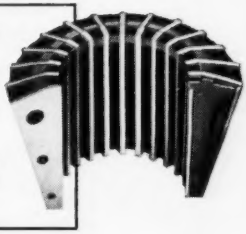


MAXIMUM FEEDS AND SPEEDS . . . Pictured above is a 1⅜" cold rolled bar being removed in a single pass with a feed of .008". Only the tremendous gripping power of the Rubber-Flex Collets permits this remarkable feat.



THE JACOBS RUBBER-FLEX COLLET

1. All external and internal surfaces precision ground.
2. The jaws in all collets have extremely long bearing surfaces in relation to the diameter.
3. Collet jaw bearing surfaces always parallel to and in full contact with work, assuring accuracy and gripping power.



FOREMOST IN CHUCKS · FIRMEST IN GRIP

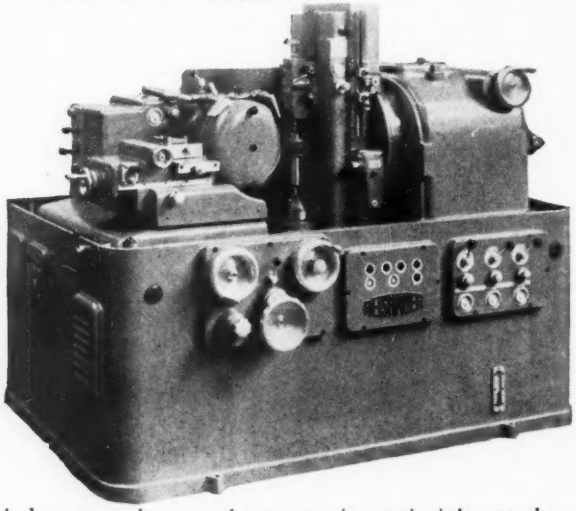
The *Jacobs* SPINDLE NOSE LATHE CHUCK

THE JACOBS MANUFACTURING COMPANY
35 Jacobs Road, West Hartford 10, Connecticut

If it's a JACOBS . . . it holds!

Time Is Your Servant

Manufacturing costs have been increasing steadily year after year. The only way to reduce costs—without sacrificing quality and accuracy—is to cut production time. Then time becomes your servant instead of your master. In the production of precision gears, the Reishauer Type ZA Tooth Flank Gear Grinding Machine provides the perfect solution to this constant problem.



The ZA Grinder, operating on the generating principle, produces accurately ground gears on a production basis. The grinding time is appreciably faster than that possible by any other method, thus substantially reducing costs. For example, a 30-tooth gear, with a pitch of DP 36, and a ¼" tooth width, can be ground from the solid blank in 13½ minutes.

If you grind gears on a production basis; if precision plus high-speed production are important to you—then the Reishauer Type ZA Tooth Flank Gear Grinding Machine will be the ideal machine for you.

This ZA GRINDER and Reishauer's LEAD SCREW LATHES and THREAD CHASER GRINDERS are fully described in illustrated bulletins.
Send for yours today!

COSA CORPORATION
405 Lexington Ave., Chrysler Bldg., N. Y. 17, N. Y.

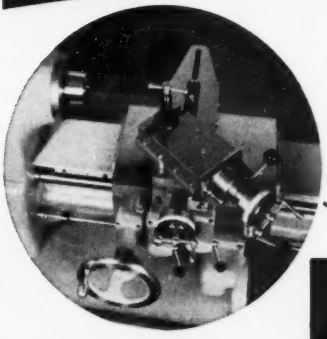
NATIONAL REPRESENTATIVES FOR: **REISHAUER—Gear & Thread Chaser Grinders—Lead Screw Lathes • BECHLER—Swiss Automatics—Cam Shapers • DECKEL—Engravers and Copy Millers • MICAFIL—Coil Winders • MIKRON—Gear Hobbers • SALLAZ—Burnishing Machines • SCHUTZ — Forming and Cutting-Off Machines • STUDER — Profile Grinders**

HARDINGE
ELMIRA, N.Y.

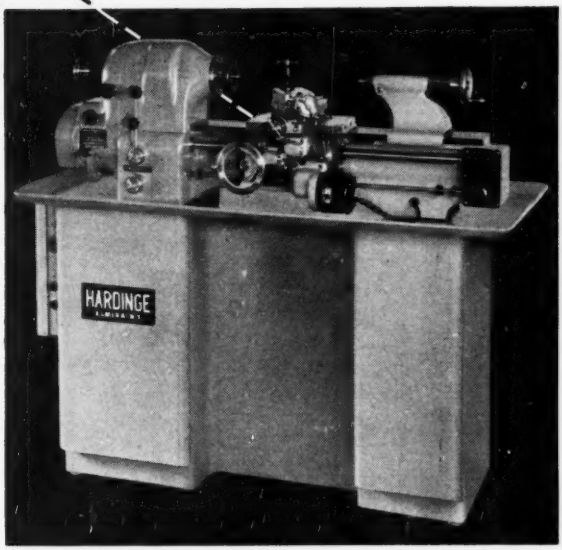
"THE MODERN TOOL ROOM LATHE"

with the

FULL BEARING CARRIAGE



- Solid Steel Hardened and Ground Bed Ways for Carriage
- Full Bearing on Top of Bed
- Full Bearing on Side Dovetails
- Sustained Accuracy and Absolute Rigidity



Model HL HARDINGE TOOL ROOM LATHE

Put this modern machine to work in your tool room —for your profit.

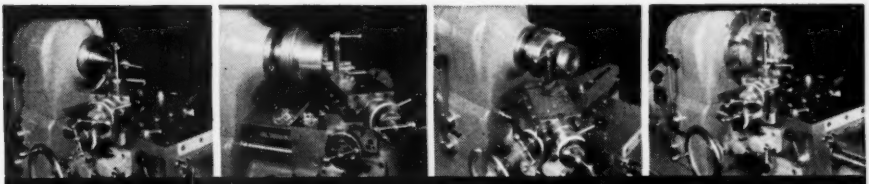
Design incorporates all features for high speed operation and extreme accuracy to cut your costs.

This low-cost machine will free larger tool room machines for large work, thereby giving added capacity on the most economical basis.

DIAMOND ANNIVERSARY HARDINGE 1890-1950

OTHER FEATURES:

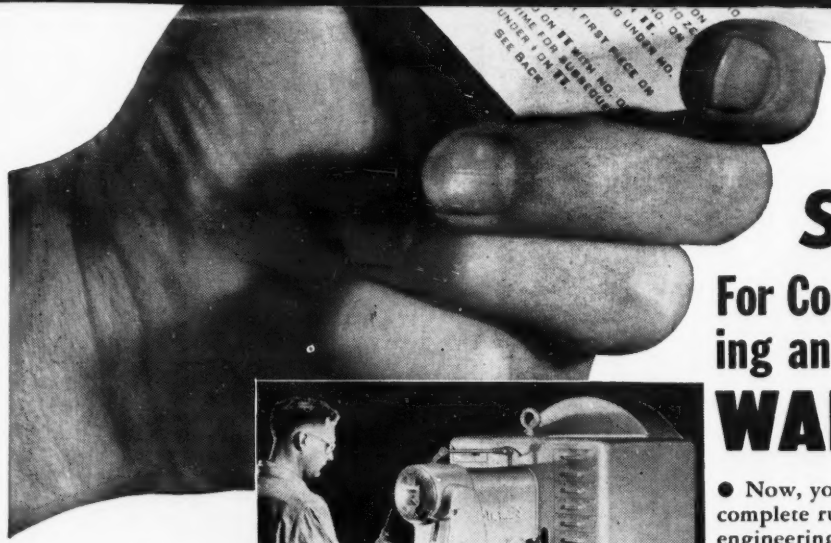
- Precision Gear Box for Threading Only
- Independent Variable Electric Feed for Carriage and Cross Slide
- Preloaded Ball Bearing Spindle Construction
- Easy Reading Black-and-White Feed Screw Dials



HARDINGE BROTHERS, INC., ELMIRA, N. Y.

See this Machine in Operation—Space 835, A.S.T.E. Exposition, Philadelphia

FREE
NUMBER OF HOLES PUNCHED
NUMBER OF BACK GUAGE SETTINGS
TIME IN MINUTES
WALES
SETUP AND OPERATION
ESTIMATOR
10A
FABRICATOR
DIFFERENT PUNCHES USED
NUMBER OF STOPS USED



SLIDE RULE

For Cost Estimating, Machine Loading and Subcontract Pricing with

WALES FABRICATORS

Wales Fabricator starts producing parts immediately from drawings ... NO TEMPLETS REQUIRED.

● Now, you can figure the time and cost of each part and complete run on a Wales Fabricator whether the part is in the engineering, planning or production stage.

There is nothing like this revolutionary Wales Fabricator. It punches, notches and nibbles. Wales exclusive Hydra-New-Matic Drive is unique in its simplicity of design and operation ... so unique, in fact, the vibration and noise is practically eliminated at 165 strokes a minute. This drive, plus Wales patented "Quick-Change" System makes possible startling "never-heard-of-before" cost savings.

Write for your FREE Slide Rule TODAY and compare THE WALES METHODS *with your present operations.*

WALES-STRIPPIT CORPORATION

George F. Wales, Chairman

398 PAYNE AVENUE, NORTH TONAWANDA, N. Y.

(Between Buffalo and Niagara Falls)

Wales-Strippit of Canada Ltd., Hamilton, Ontario

Specialists in Punching and Notching Equipment

WHEN YOU THINK OF DOWELS

THINK OF ALLENS

- **Allens for Strength**

  Made from Allenoy steel. Heat treated for hard exterior and strength of core. (Shear strength up to 150,000 p.s.i.)

- **Allens for Mirror-like Surface**

  Tru-ground to roller bearing smoothness. (Surface hardness 62-64 Rockwell C scale.)

- **Allens for Uniform, Gauge-like Accuracy**

  Made to tolerances of ± .0001".

- **Allens for Economy**

  Far less expensive than dowel pins of old-fashioned materials and manufacture.

Sold Only Through Leading Industrial Distributors

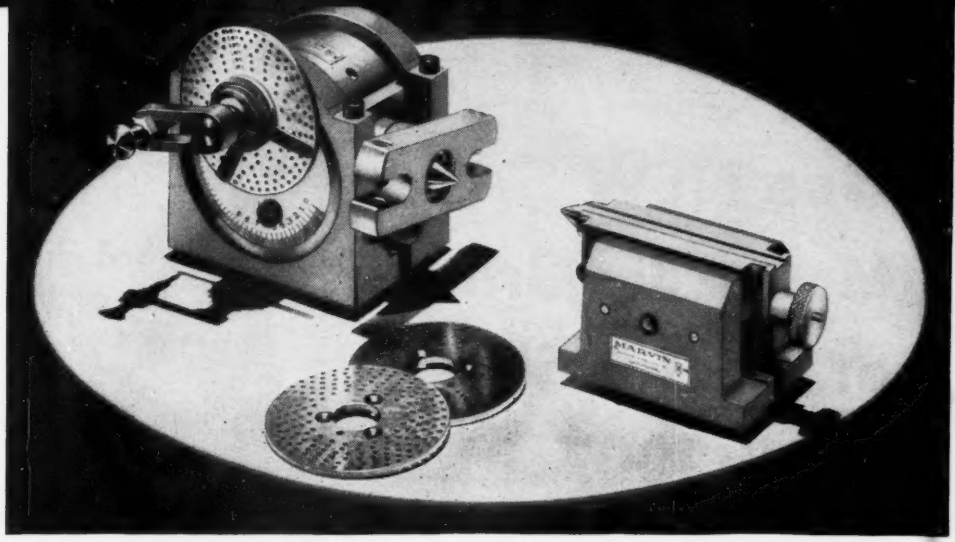
Write the factory direct for technical information and informative literature.

ALLEN ALLEN HEAD

MANUFACTURING COMPANY

Hartford 2, Connecticut, U. S. A.

NEW YORK, CLEVELAND, DETROIT, CHICAGO, LOS ANGELES

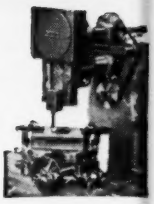


NEW! "PRECISION ENGINEERED" *Marvin* DIVIDING HEAD

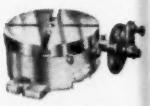
A New Dividing Head made to the exacting precision standards of Marvin Tool Makers. Designed for dividing operations required in gear cutting, layout, splines, fluting taps or reamers, cams, hex screws and squaring shafts. The unit comes complete with 3 index plates, each plate having 6 sets of holes. It will tilt from 5 degrees below horizontal axis to 30 degrees past vertical axis. Total 125 degrees. The complete dividing head weighs 15 lbs. Tail stock has two pins, which align it in a horizontal position with the head stock. It is vertically adjustable for tapered work. Head has 40:1 ratio. Tail center travel is one inch. Spindle nose No. 2 Morse taper socket and 1"-10 threads. Rugged head and tail stock. Head is carried on two heavy trunnions. Priced at $99.50.

Marvin precision materially reduces production costs

Copyrighted 1950 by H. B. Hazerodt

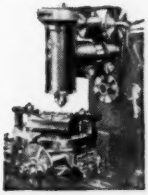


MARVIN SLOTTING ATTACHMENT. No. S-1070



MARVIN ROTARY INDEX TABLE. No. 7-1102

MARVIN MICROMETER BORING HEAD. No. M-1000

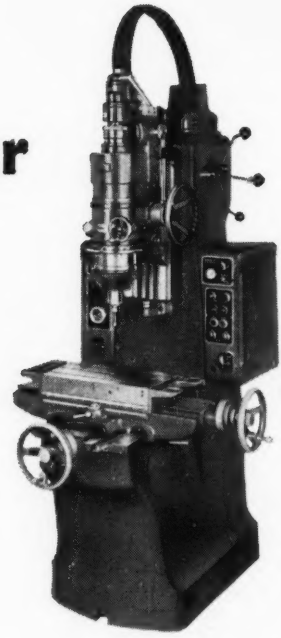


MARVIN VERTICAL MILL ATTACHMENT. No. V-1200

MARVIN MACHINE PRODUCTS, INC.

SALES OFFICE 414 FORD BLDG. DETROIT 26, MICHIGAN

See NEW Moore Jig Grinder at A.S.T.E. Show Booth 1007



Advanced Jig Grinding of *Contours* as Well as Holes Features Larger, More Versatile Machine.

Moore, originator of the Jig Grinder, proudly announces that: Any contour—regular or irregular—can now be ground with all the speed and accuracy which has made the Jig Grinder so popular for locating and grinding straight and tapered holes. The new No. 2 model expands the original Jig Grinder principle to include form and chop grinding of contours, so that the most complex die section can be completely ground in a fraction of the time required by other means.

The new model is the result of the experience of over 500 Moore Jig Grinder users (including our own toolroom) during the last ten years.

We've kept all the field-proven features of the No. 1, and added these advantages:

1. GREATER CAPACITY AND SIZE
2. FEATURES TO FACILITATE CONTOUR AND CHOP GRINDING
3. INFINITE GRINDING SPEEDS FROM 12,000 TO 60,000 R. P. M.
4. MORE POWER TO GRINDING WHEEL
5. INFINITE FEEDS UP OR DOWN
6. SLOT GRINDING ATTACHMENT
7. SPINDLE HOUSING HEAT CONTROL

NO. 2 JIG GRINDER SPECIFICATIONS

Capacity—
Table size—10" x 19"
Table movement—10½" x 16½"
Table top to wheel collet—0 to 16"
Spindle to column ways—10"
Spindle to column below ways—12½"

Spindle Speeds—
4—85-170-255-350
Spindle feeds by airpowered hydraulic control—infinite from 0—120 strokes.

Grinding Speeds—
12,000 to 60,000—3 heads

Other Moore Equipment On Exhibit

NO. 2 JIG BORER
(see facing page)

PANTO-CRUSH WHEEL DRESSER
—combining roll-crushing and diamond dressing.

MOTORIZED CENTERS
—for use on surface grinder, jig borer, jig grinder, drill press, etc.

HOLE LOCATION ACCESSORIES
—full complement of small tools for 3 basic steps—locating, cutting, inspecting.

Have you bought your copy of "PRECISION HOLE LOCATION"?

Over 6,500 copies of this valuable book on toolmaking practices have been sold to date. Available at special price of $3. 448 pages, over 400 illustrations, 184 pages of Woodworth Coordinate Location Tables from 3 to 100 holes. Send check or money order to Moore Special Tool Co., Inc., Bridgeport

SEE these parts produced in Moore booth

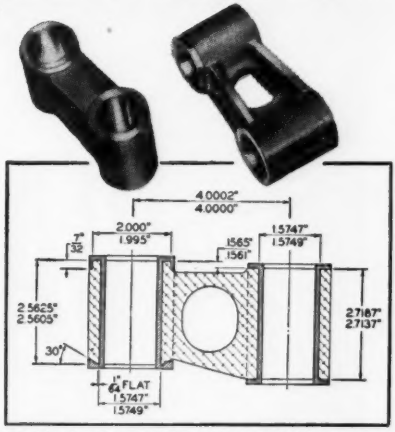
Jig Boring close tolerance work cuts production time 90%

It took 3½ hours to machine each of these aluminum-alloy supporting arms, used on our Moore Panto-Crush Wheel Dresser, on a boring mill. Now—on our No. 2 Jig Borer—it takes only 22 minutes per piece for lots of 100—a time saving of 90%. Hole diameters and between-centers dimensions are held to 0.0002" to insure extreme accuracy between pivot points in the wheel dresser and allow the installation of precision bearings in the holes. Read the job details at the right.

Moore Jig Borers are being used more and more on short-run production of precision work—boring, drilling, reaming and inspecting precisely located and machined holes in production parts, as well as in dies, jigs and other tools.

Write today for our new 24-page catalog, containing other examples of time- and cost-cutting Jig Borer operations.

MOORE SPECIAL TOOL CO., INC.
730 UNION AVE., BRIDGEPORT 7, CONN.

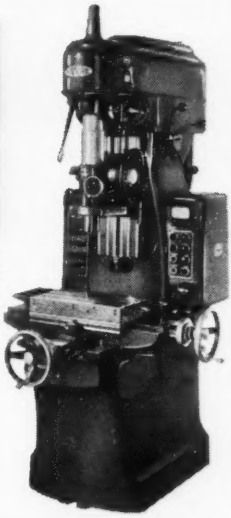


Two holes, three flat and one beveled face and shoulder on one boss (the areas crosshatched in drawing) are all machined on the Jig Borer—in only 22 minutes.

Everything done on Jig Borer, using easily-made holding fixture that provides both milling and boring positions

Oper. No.	Operation Name	R.P.M.	Feed	Min.	Sec.
1	Load and mill ribs — Single Point fly cutter	1000	H	1	00
2	Set Up and rough bore — two holes	2000	.0015	2	10
3	Rough face two top surfaces Single Point fly cutter — Remove part to cool —	1000	H	1	35
4	Load and second rough bore two holes	2000	.003	1	50
5	Finish bore two holes	2000	.0015	2	40
6	Check two holes for size			1	00
7	Rough and finish 30° bevel	800	H	3	00
8	Rough and finish one bottom face	800	H	1	00
9	Finish face two top surfaces Out-feed chuck	800	.0025	4	35
10	Rough and finish 2" diameter shoulder	400	H	3	00
	TOTAL TIME			21	50

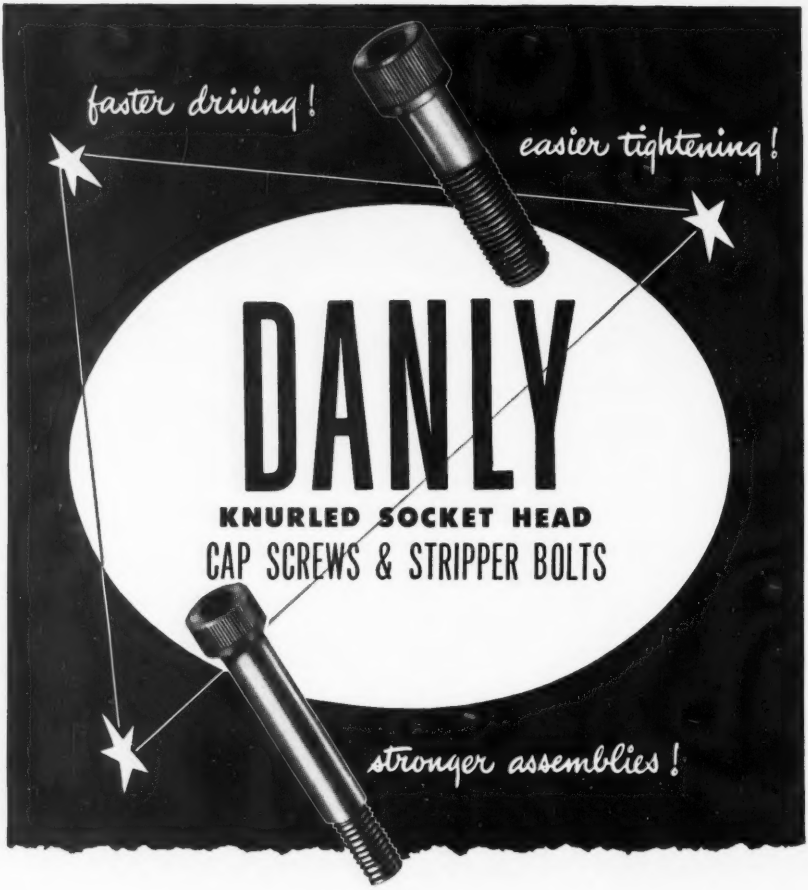
Checking hole size—held to 0.0002". Simple holding fixture provides both boring and milling positions.



No. 2 Jig Borer with table working surface of 10" x 19"

ADD MOORE TOOLS TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • DIE FLIPPERS • MOTORIZED CENTERS • HOLE LOCATION ACCESSORIES



FASTER DRIVING! Knurled heads assure a firm finger grip for easy setting by hand! Danly Knurled Socket Head Cap Screws and Stripper Bolts can be driven almost all the way "home" before the wrench is applied for final tightening.

EASIER TIGHTENING! Hexagon socket heads accommodate convenient key type wrenches, assuring easier driving in awkward locations and permitting more compact assembly. For special jobs, special wrenches are easily made from standard hexagon stock.

STRONGER ASSEMBLIES! Danly Knurled Socket Head Cap Screws have been tested to 289,200 pounds per square inch . . . shearing under the head is minimized! Precision threads assure more actual thread bearing and permit harder tightening without danger of stripping.

DANLY

SEND FOR THIS FOLDER for complete catalog and purchasing information.

DANLY MACHINE SPECIALTIES, INC.
2100 South 52nd Avenue, Chicago 50, Illinois

in the toolroom...

C/R's

NEW JAW-HEAD Rawhide HAMMER

adds new convenience to the safety and protection of Rawhide

Men in the toolroom find C/R's new Jaw-Head hammer a real time-saver. Rawhide faces are replaced in a jiffy—loosen a nut, insert new faces, tighten nut and they are held in a vise-like grip. C/R Jaw-Head hammer faces are made of tough, resilient waterbuffalo hide . . . superior in their ability to absorb shock, deliver powerful blows, and protect delicate finishes. Safety-Flare grip handle prevents slipping. For safety, economy and power, get the new C/R Jaw-Head *Rawhide* hammer!

- *Other C/R striking tools: Rawhide Mallets, Rawhide Mauls, Solid Head Rawhide Hammers.*

- ***Out with the old face — in with the new!***

To release jaws, loosen this nut.

Change to new C/R Rawhide faces.

To tighten nut, use wrench for best results.

Available from leading Industrial Suppliers.

CHICAGO Rawhide MFG.CO.

1207 Elston Ave. Chicago 22, Illinois

If you have high Break-Even Point headaches...

The Carboloy "Triple C" Plan is the medicine you need! It provides a Quick and Positive way of lowering variable costs

EVEN UNDER today's conditions, it is possible to realize savings in variable costs . . . savings so substantial that the Break-Even Point can often be lowered.

Hard to believe? Well, Carboloy Company's unique "Triple C" Plan of Coordinated Carbide Control has helped countless manufacturers make such savings. Results speak for themselves. For example:

A large manufacturer of pumps cut machining time 40% under "Triple C". A second manufacturer doubled production and held down costs in spite of rising wages. Still another company reduced new tooling costs by one third.

Think of what savings like these can do toward lowering the crucial Break-Even Point!

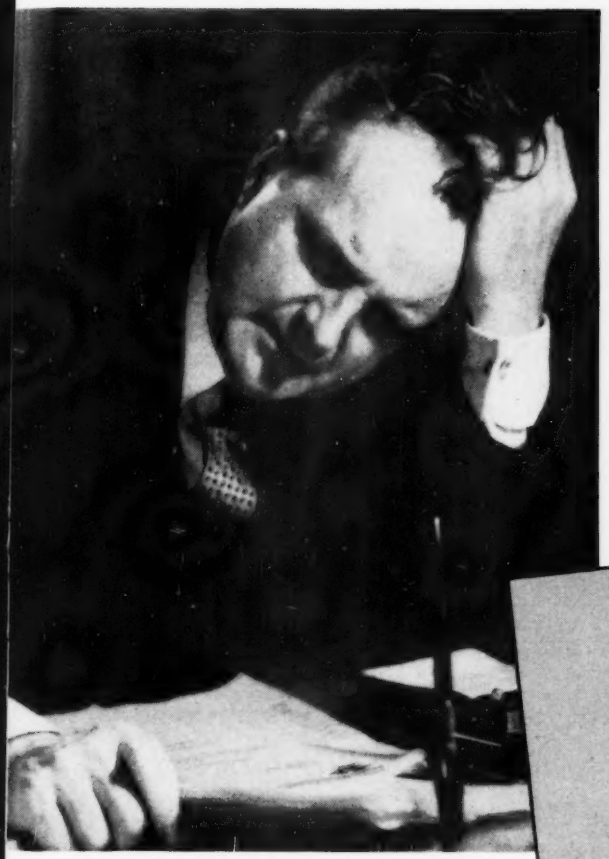
What is this "Triple C" Plan that works such miracles? It is a field-tested and proven plan for coordinating all phases of carbide tool design, application and maintenance in your plant through a system of centralized control. It is a program that touches every phase of operation and produces the kind of major savings that are reflected in the profit-or-loss statement.

It has worked for others . . . it can work for you!

The "Triple C" Plan has performed sensationally for major companies in *reducing costs, increasing production, eliminating waste.* It can work as effectively for your company. The CCC Plan Book, specially prepared for savings-minded management executives, tells the story. Why not send in the coupon for your complimentary copy today? There is no cost, no obligation. Carboloy Company, Inc., Detroit 32, Mich.

Visit Carboloy booth No. 736 at the A.S.T.E. Show.

CARBOLOY®



THIS BOOK TELLS HOW "TRIPLE C" CAN WORK FOR YOU

SEND FOR YOUR CCC PLAN BOOK TODAY—

COORDINATED CARBIDE CONTROL

FOR EVEN GREATER SAVINGS WITH CARBIDES

CEMENTED CARBIDE

CARBOLOY COMPANY, INC.,
11143 E. 8 Mile Street, Detroit 32, Michigan

Dear Sirs:

We want to know more about the Carboloy "Triple C" Plan to help lower our Break-Even Point. Without obligation, send us a copy of your CCC Plan Book for management and supervisory executives.

Name _____ Title _____

Company _____

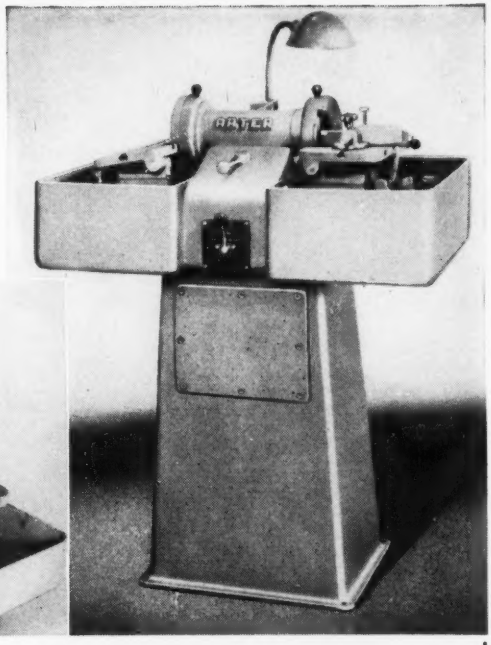
Address _____

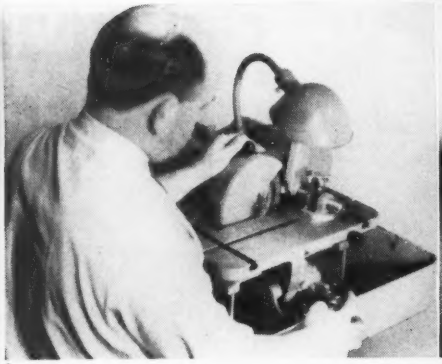
City _____ Zone _____ State _____

ARTER

IMPERIA

Carbide Tool Grinder





Off-hand grinding of tools is seldom a satisfactory operation. Hands are unsteady, tool shanks can be rough or not flat, work tables may not be smooth. The result — poor tool grinding, shorter life between grinds, possible damage to expensive diamond wheels.

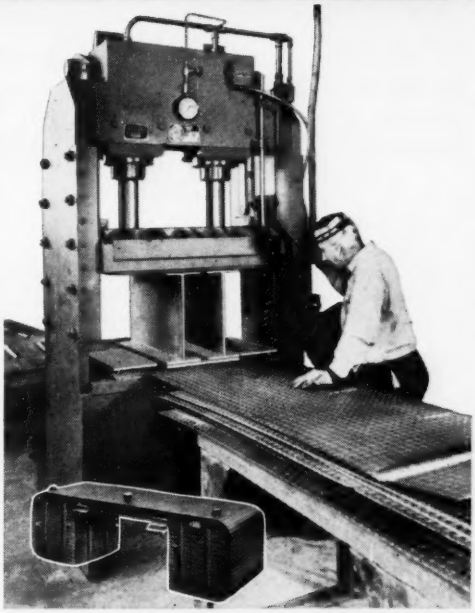
ARTER IMPERIA CARBIDE TOOL GRINDER work tables are *movable*. Tables are held on two pivot-edged side plates by vertical tension springs, forming a flexing mounting. Very light hand pressure moves table and tool forward and back across the face of the diamond wheel. When grinding chip breakers the wheelhead also can be moved up and down, a compression spring giving smooth easy action. This compact double-table machine can be set up for roughing and finishing tools, finishing and polishing, or finishing and grinding chip breakers.

ARTER Grinding Machine Co.

WORCESTER, MASS., U. S. A.

"I wouldn't sell it for twice what it Cost"

● PERKINS WELDING SAYS KRW 100-TON PRESS PAID FOR ITSELF IN SIXTY DAYS THRU MATERIAL AND LABOR SAVINGS!



BIG TRAILER TRUCKS eat up a lot of gas on an average run. For that reason, most are equipped with big "saddle tanks" which hold 125 gallons or more... thus obviating frequent stops to fuel up. Perkins Welding makes these super tanks out of 1/8 inch steel. Until recently, they welded angle stiffeners onto the tanks for extra strength. A KRW Engineer showed them how they could save considerably by forming stiffening ribs on a KRW 100-Ton Press. The result... savings so great that "it paid for itself in 60 days."

"You don't need a sledge to drive a tack." For the same reason... on a big percentage of forming, blanking and stamping work... you don't need large, heavy-tonnage presses with their high initial and operating costs.

Production records, in a variety of industries, show that KRW Presses greatly reduce costs. First investment is very low, operating costs are still lower. In one instance the purchase price of a KRW Stamping Press was less than the foundation cost for heavier equipment.

LET US KNOW YOUR NEEDS

...we are fully equipped to engineer our equipment to handle your work. In the majority of cases, we can make delivery in a fraction of the time required for other type presses. Let us hear from you.

K·R·WILSON
215 MAIN ST. · BUFFALO 3, N. Y.

K. R. WILSON, 215 Main St., Buffalo 3, N. Y.

Please quote me price and information on KRW 100-Ton Hydraulic Press.

16

Tonnage Req.....

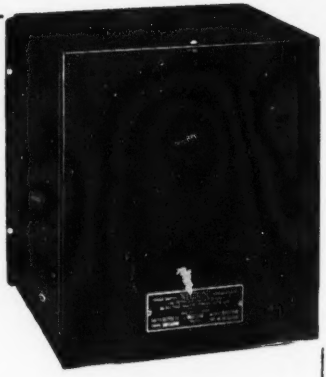
Name .....

Address .....

City and Zone..... State.....

NEUTROL
Magnetic
Chuck
Controls

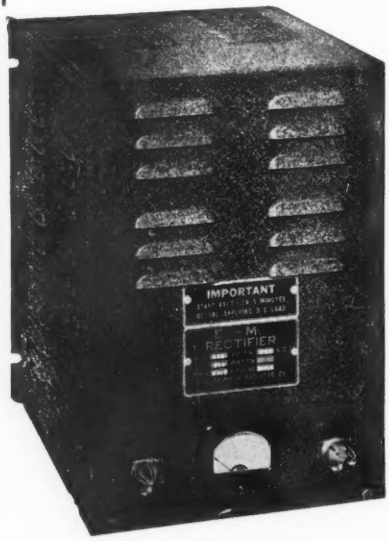
WHEREVER MAGNETIC CHUCKS ARE USED



THE ELECTRO-MATIC RECTIFIER AND NEUTROL MAGNETIC CHUCK CONTROL ARE INDISPENSABLE FOR BETTER AND SAFER GRINDER PERFORMANCE

NEUTROL Magnetic Chuck Controls speedily release and demagnetize workpieces. With NEUTROL, there's no need to hammer or pry to release the work. This saves time and tempers—saves marred, distorted workpieces and prevents damaging of chuck faces. NEUTROL also protects chucks against harmful voltage surges.

ELECTRO-MATIC Rectifiers are sturdy, heavy duty, direct current supply units, engineered to "stand up" day-after-day in the hardest service. They are available in any desired voltage combination in capacities ranging from 50 to 20,000 watts.



NEUTROL and ELECTRO-MATIC Rectifiers can be installed easily on equipment already in use — or built into new machines before delivery if you so specify.

Let us send bulletins giving full information—no obligation.

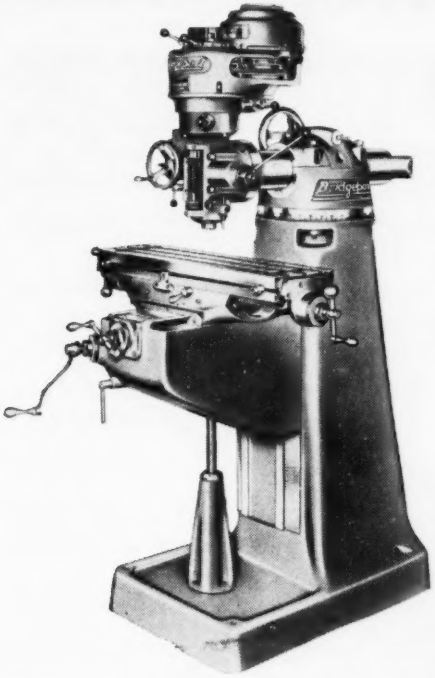
ELECTRO-MATIC PRODUCTS CO.
2237 North Knox Ave., Chicago 39, Ill.

ELECTRO-MATIC
Industrial
Rectifiers

These NEW DEVELOPMENTS

mean even greater utility

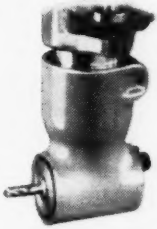
Bridgeport



The Bridgeport Turret Milling Machine with its New 1 H.P. Milling, Drilling and Boring Attachment has had its remarkable versatility still further extended through the development of Cherrying and Right Angle Attachments shown at work here. Furthermore the new Bridgeport Milling Machine Vise and Boring Head add greater convenience and capacity to a machine which has already found outstanding acceptance in the World's leading die shops and tool rooms as well as on the production lines of countless metal working shops.

CHERRYING ATTACHMENT

Designed for producing concave and convex shapes. Specially useful in producing drop forge dies, molds and cavities, metal core boxes, etc.



HEAVY DUTY RIGHT ANGLE ATTACHMENT

For milling and drilling at right angles.

LIGHT DUTY RIGHT ANGLE ATTACHMENT

Specially designed for milling and drilling narrow, deep molds and cavities.

FULL DETAILS ARE AVAILABLE UPON REQUEST.

Booth No. 1031, A.S.T.E. Show

Bridgeport MACHINES, INC.

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

Not Until You've Tried
Not Until You've Seen . . .

will you know the gratifying savings,
the improved work-quality
that abrasive plus rubber,
combined in BRIGHTBOY,
will bring to your
finishing.

WHEELS
RODS
STICKS
BLOCKS

for machine and manual operations

abrasive + rubber =

More and more metalworking, woodworking and plastics products manufacturers are using BRIGHTBOY to offset rising costs, increase profits:

BURRING • CLEANING • FINISHING POLISHING • *IN ONE OPERATION*

A perfectly "balanced" combination of abrasive and rubber, Brightboy is used following the rough grind. It:

1. *Bridges the gap between the rough grind and the buff, frequently in one operation.*
2. *Works to close tolerances; can be shaped to contour.*
3. *Produces a wide variety of conventional and special finished and patterns; frequently the final polish.*
4. *Requires no before-use preparation or dressing; no skilled labor to handle it.*

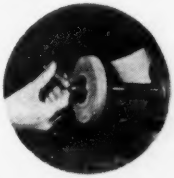
Brightboy Rod in drill press, burring and polishing inside of guide hole.

Cleaning and smoothing of threads with Brightboy hand tablet.

MAKE TESTS • GET COSTS • COMPARE *QUALITY*

Here's an opportunity that methods and production men have wanted, waited for. Ask your dealer for samples and for the Brightboy Catalog-Manual, giving work short-cuts. Write the Brightboy Service Department on any methods or production problem where finishing is involved.

BRIGHTBOY INDUSTRIAL DIVISION
Weldon Roberts Rubber Co., Newark 7, N. J.
America's Pioneer Manufacturers of Rubber-Bonded Abrasives



Smoothing and burring dural and stainless steel parts with Brightboy Wheel.

Polishing base of elbow tube with Brightboy Wheel.

WELDON ROBERTS

Brightboy

REG. U.S. PAT. OFF.

SEE IT AT THE A.S.T.E. SHOW

MAKES IT EASIER TO RADIALLY RELIEVE CUTTING TOOLS

★ You, too, can take advantage of the faster, cleaner cutting ability and longer life of radially relieved tools.

D-S has simplified the job. Any good grinder hand can produce this relief actually faster than regular angular back-off on taps, step drills, counterbores, profile mills, gear tooth rounding cutters, etc., of 1 to 14 flutes, with or without centers.

WRITE FOR OUR CATALOG ON TOOL GRINDING FIXTURES

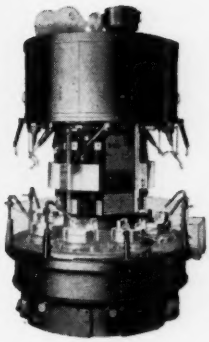
D-S GRINDER DIVISION

ROYAL OAK TOOL & MACHINE CO.

621 E. 4th St. • Royal Oak, Mich.

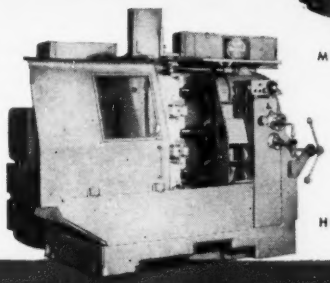
for your information

the BULLARD complete line

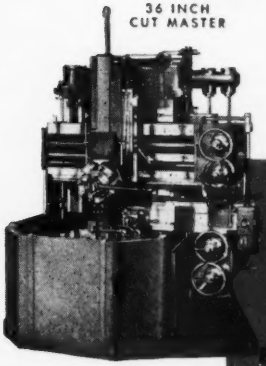


TYPE "D"
MULT-AU-MATIC

BULLARD



30-H
HORIZONTAL
LATHE



36 INCH
CUT MASTER

THE
BULLARD
COMPANY
BRIDGEPORT 2, CONNECTICUT

DISSTON®
METAL CUTTING BAND SAWS

...COST CUTTERS!

Full speed production • Precision work • Added tool life • Lower costs . . . with Disston Metal Cutting Band Saws. Hard Edge Flexible Back; also made Hardened Throughout. Regular and Buttress Tooth patterns. Tooth spacings, settings, widths, gauges, to fit your requirements.

Uniform hardness and temper—toughness—cutting edges that last longer—are assured by Disston Steel, made with Disston Skill.

DISSTON SAFETY REEL—Conveniently holds 100 ft. band saw coils reeled for safety. Widths from ⅛" to ½". Packed in cartons.

Disston Service—including analysis of your tool applications by qualified Disstoneers—can add to your savings of time, tools and material . . . drive your costs to new lows!

DISSTON BITE-RITE® FILES

Faster cutting • smoother working • longer lasting. All Double Cut files have the distinctive wavy tooth pattern which means less tracking. A complete line of American Patterns. Also Superfine® Swiss Pattern for your most exacting work. Cuts, shapes and sizes correct for your work.

DISSTON HACK SAW BLADES

Tougher. Longer lasting edges. For a wide variety of machine and hand metal cutting operations. Four types—all money savers: HIGH SPEED • DI-MOL® • CHROMOL® • DURAFLEX®.

DISSTON HACK SAW FRAMES

Four sturdy, practical styles, quickly adjustable to four cutting positions for 10- or 12-inch blades.

*Reg. U.S. Pat. Off.

Buy through your Disston Industrial Distributor

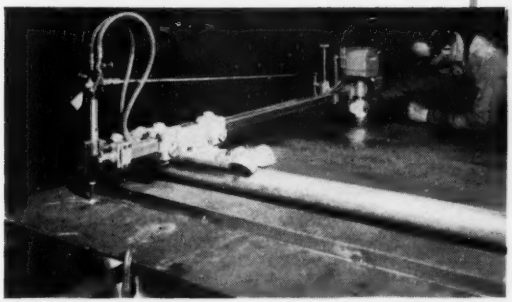
HENRY DISSTON & SONS, INC.

421 Tacony, Philadelphia 35, Pa., U.S.A.

In Canada, write: 2-20 Fraser Ave., Toronto 3, Ont.

"We can't say enough about Airco's NEW No. 3 Monograph . . . its portability, accuracy and shape cutting versatility make it a MUST for every metal working shop..."

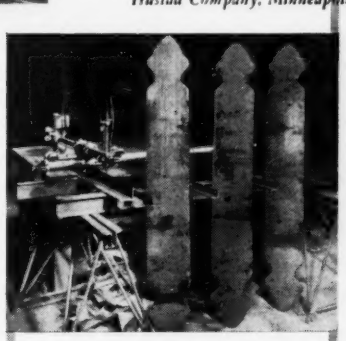
Says Mr. J. C. Hustad, President
Hustad Company, Minneapolis, Minn.



Used for machine gas cutting of special structural shapes at Hustad, the Airco No. 3 Monograph has more than proved its ability to meet the demand for straight line, circle and bevel cutting, with an extremely high degree of accuracy.

Further, with a cutting area of 32 inches by 56 inches, it gives excellent results in cutting most any steel shape up to 8 inches thick . . . and a 6-foot 8-inch rail can be added, extending the cutting area indefinitely.

This NEW machine is the lowest priced machine of its type in the field (only $695, including a manual tracing device, torch, tip, tubular rail, hose and carrying case). Also, it is portable — the machine itself weighs but 110 lbs. and the tubular rail 35 lbs. The entire unit is packed in a carrying case which can be conveniently handled by two men.



SPECIAL TRIAL OFFER
(Good in Continental U.S.A. Only)

If you would like to try this machine for two weeks *in your own shop on your own work*, just drop a letter to your nearest Airco office or authorized Airco dealer and they will advise you how a shop-trial can be arranged . . . or, if you would like a descriptive folder (ADC-660) they will be glad to send you a copy.

This shows a clevis for a steel mill guide cut from 6" plate — note the smoothness of the cut, reducing considerably machining cost and time.

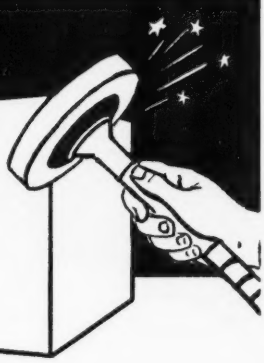
AIRCO

AIR REDUCTION
Offices in Principal Cities

Headquarters for Oxygen, Acetylene and Other Gases
Calcium Carbide Gas Cutting Machines
Gas Welding and Cutting Apparatus and Supplies
Arc Welders, Electrodes and Accessories.

Cut Costs

IN THE FIXED 35%



with *haskins*

FLEXIBLE SHAFT MACHINES

A recent survey shows that direct labor accounts for 35% of the total fixed cost of grinding, polishing and similar operations. One or more Haskins flexible shaft machines can help you reduce this cost by increasing production per man-hour... free man-hours for other jobs in your plant.

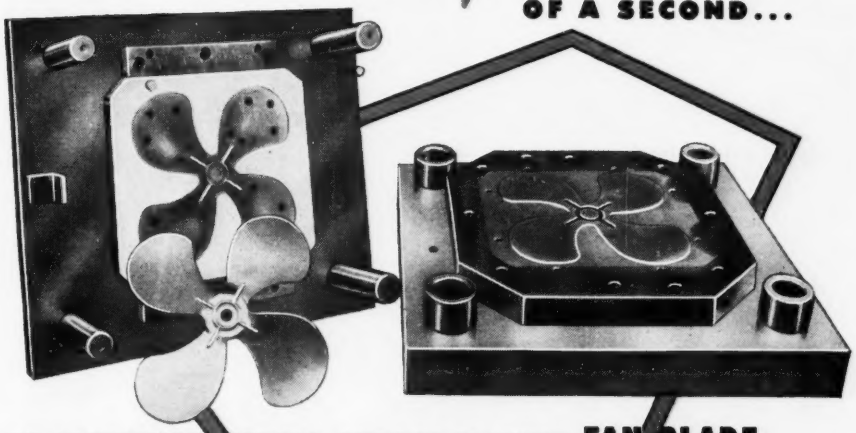
Outstanding Haskins features such as: dependable, constant speeds — rugged construction — low maintenance and a complete line of accessories and attachments recommend your early investigation of their cost-cutting possibilities in your plant. Get complete details. Consult your classified phone book for the Haskins Engineer nearest you or write to: R. G. Haskins Co., 2647 W. Harrison St., Chicago 12, Ill.

HASKINS

haskins

FLEXIBLE SHAFT EQUIPMENT

Every **FOUR-FIFTHS OF A SECOND...**



AN ACCURATELY PIERCED, EMBOSS-BLANKED FAN BLADE
with a compound die and

PRODUCTO DIE SET

See our exhibit, Booth 1065, at the A.S.T.E. Exposition, April 10-14 in Philadelphia, Pa.

This blade — used in an oscillating, cooling fan — turns at 3600 R.P.M. Perfect blade balance must be maintained for quiet, efficient operation. Such an exacting demand could be met only by using the most accurate of die sets. A PRODUCTO Special Die Set handles this job very efficiently... at a production rate of 4500 blanks per hour an average of 85,000 pieces between grinds is maintained.

The job specifications indicated no burrs would be allowed while maintaining a tolerance of ± .001" in producing this 10" diameter fan blade. The strip stock used, H.H.C.R. Steel, 1/32" thick in 12 ft. lengths, assures perfectly flat blanks, (a final operation adds the necessary blade pitch).

The 18" x 14", four pin, Special PRODUCTO Die Set (above) is one of many approved wholeheartedly by our customers. For your next die set buy PRODUCTO and experience the satisfaction of seeing a tough job well done.

Call "Producto" in classified telephone directory in major stamping centers. Fast service thru 26 Producto Representatives.

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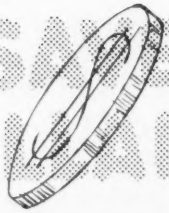
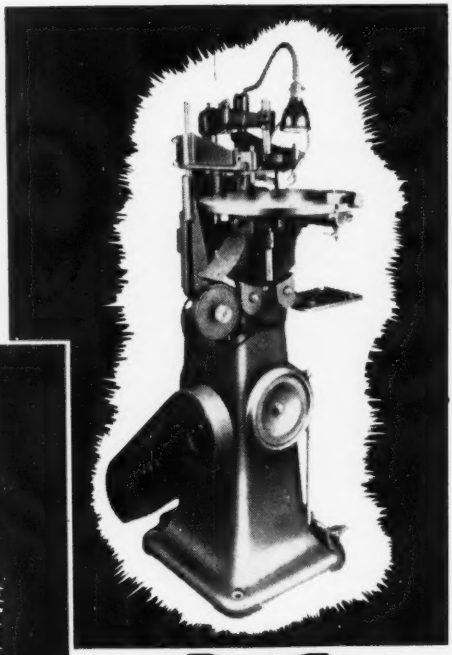
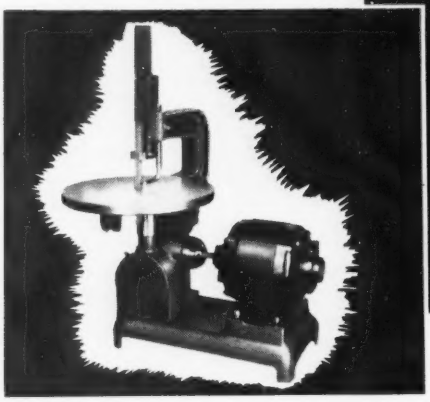
8P010



SAVE DOLLARS

IN YOUR TOOL ROOM





OLIVER OF ADRIAN

Save dollars in your tool room. Oliver Die Makers are saving as much as 60 per cent or more in tool rooms across America.
The old obsolete hand method of Die Making is expensive, slow and laborious.

OLIVER OF ADRIAN

The Oliver Die Maker is *faster, more accurate*, less operator's fatigue and will modernize your tool making methods.
Oliver Die Makers come in five models. The Bench Model S-1, illustrated, is a single speed die maker for use on tool steel up to 1" thick. The Heavy Duty Model has 6 speeds, works in metal up to 3" thick, has variable strokes to 5" plus hydraulic feed.
WRITE today for complete technical data on Oliver Die Makers.

OLIVER INSTRUMENT CO.
1430 E. MAUMEE • ADRIAN, MICHIGAN

AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS—DRILL POINT THINNERS—TEMPLATE TOOL GRINDERS—FACE MILL GRINDERS—DIEMAKING MACHINES

A Small Valve for BIG JOBS

NOPAK 4-Way Model SL RING-TYPE Solenoid VALVE

NOPAK Model SL, 4-Way Ring-Type Solenoid Valve. Weight 5¾ lbs., 5⅞" long, 3" wide, 5½" high. ½" pipe size only. Cylinder Ports may be reduced to ⅜" or ¼".

Does the work of bulkier, heavier and costlier solenoid valves of same capacity. Designed for air operation only, at pressures from 40 to 250 P.S.I. Functions effectively mounted in any position. Employs solenoid-actuated pilot rather than direct solenoid pull on sealing mechanism.

Has the Features you Want!

1. Light 3-piece valve body of drawn aluminum.
2. Chrome-plated Operating Shaft floats in Neoprene O-Rings — requires minimum lubrication.
3. Standard Solenoid Unit — easily replaced, readily available.
4. Current Economy — 0.96 amperes at 220 volts.
5. This valve gives you long-run, high speed operation . . . up to 500 cycles per minute . . . or continuous energization in one position.
6. Sub-Plate mounting furnished at extra cost, if desired.

NOPAK

VALVES AND CYLINDERS

DESIGNED for AIR and HYDRAULIC SERVICE

Write for Bulletin SL

GALLAND-HENNING MFG. CO.
2758 SOUTH 31st STREET
MILWAUKEE 15, WISCONSIN

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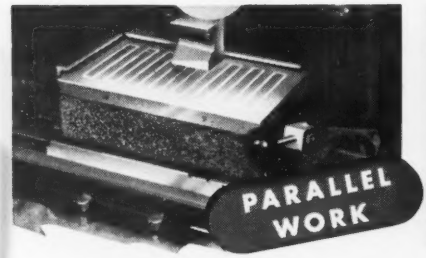
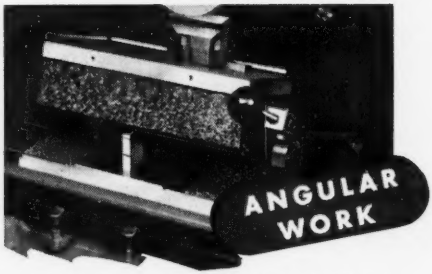
Representatives in Principal Cities

A 5740-½I-A

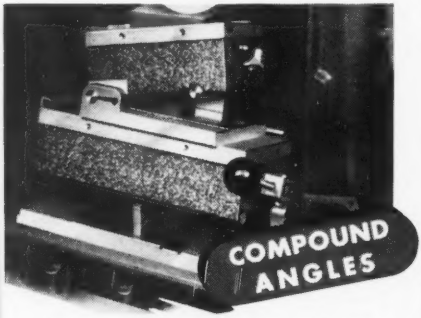
The MAGNA-SINE is more versatile than any other magnetic chuck



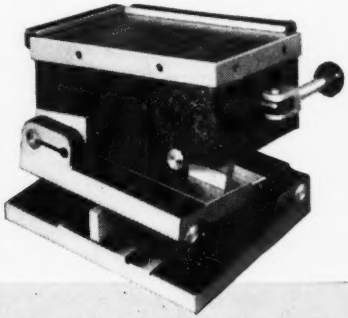
The Magna-Sine, when closed, serves as a conventional magnetic chuck for surface grinders. The chuck is permanent-magnet type and built to precision tolerances. Suitable for either wet or dry grinding.



When an angular job comes along, the Magna-Sine is accurately set up by inserting standard gauge blocks. The proper blocks are indicated in the Table of Constants furnished with each unit. Think of the saving; angular set-ups—*to gauge block accuracy*—made in a matter of minutes with the Magna-Sine.



For compound angular work, add another single angle Magna-Sine.* The additional unit may be held securely by the magnetic chuck of the first unit. Any desired compound angle can be set up fast and with positive *gauge block* accuracy.



***This unit is the Magna-Sine for both single and compound angular set-ups. It can be used for parallel work, single angle or compound angle set-ups. Available in two sizes.**

Send for completely descriptive bulletin showing models and prices. See how YOUR shop can save by using Magna-Sines on all surface grinders as well as angular set-ups for inspection, jig boring and other precision operations.

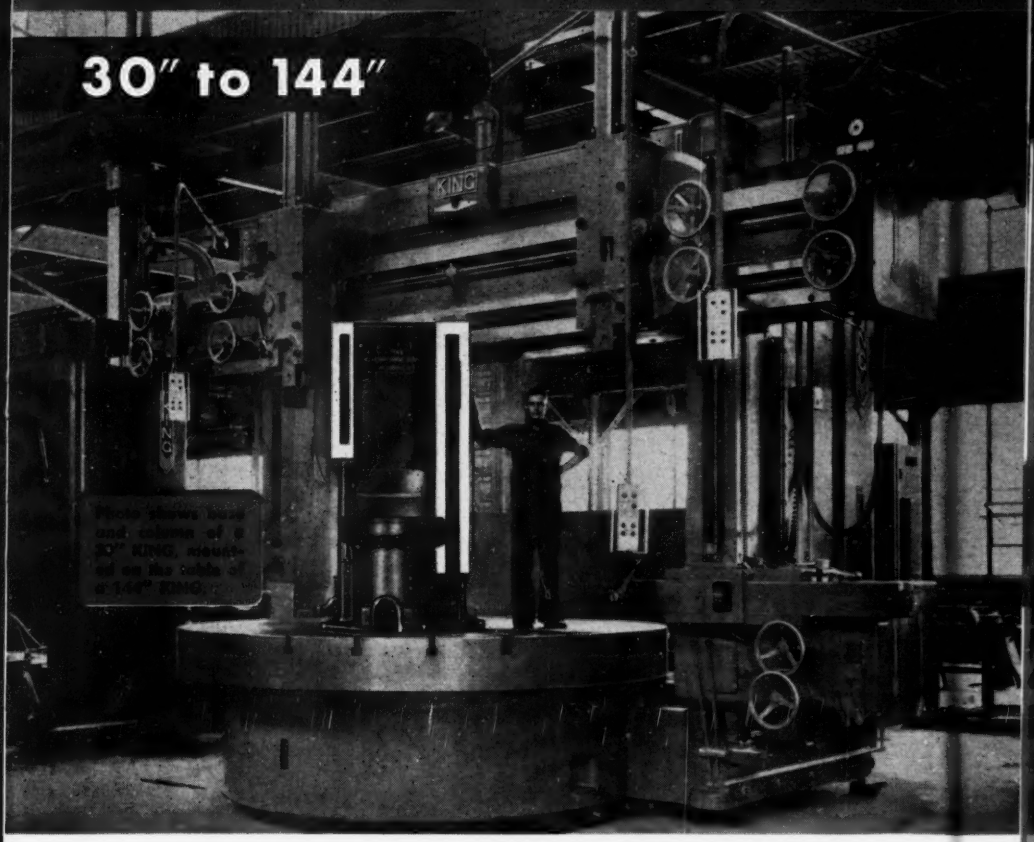
OMER E. *Robbins* COMPANY

Manufacturers of the MAGNA-SINE and Other Precision Tools

5722 Twelfth Street ● Detroit 8, Michigan

KING Makes the Widest Range

OF VERTICAL BORING AND TURNING MACHINES



The KING line of Vertical Boring and Turning Machines is not just a "large size" or a "small size" line. It's an all size line. KING and *only* KING "covers the field", with 10 sizes: 30" and 36", one head on rail—42", 52", 62", 72", 84", 100", 120", and 144", one or two heads on rail. All sizes are available in a variety of head combinations, with or without side head.

KING has the size range—and KING has the extra weight and rigidity, the speeds, the power, the time-saving ease of control that adds up to *more work and better work at less cost.* Get the facts. Write today for catalog giving detailed information. Specify the size machines that meet your job requirements.

American Steel Foundries

KING MACHINE TOOL DIVISION

CINCINNATI 29, OHIO

Builders of Vertical Boring & Turning Machines and Sebastian Lathes

The largest range of standard sizes . . .
Tapers per inch — .005, .008, .013
ESPECIALLY TREATED
FOR MODERN DIE STEELS
Rapid cutting capacity

These factors make

GAMMONS

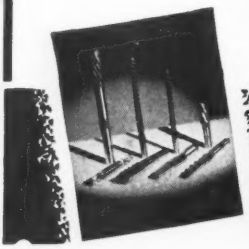
Taper Reamers tops in convenience and cost reduction.

GAMMONS Helical Die Makers Taper Reamers are made with tapers which give the correct clearance for all types of die work.

Write for data sheets, giving sizes, clearances and tapers, and state work to be done.

Also manufacturers of helical taper pin, chucking, and hand reamers.

A. S. T. E.
EXPOSITION
BOOTH
No. 31

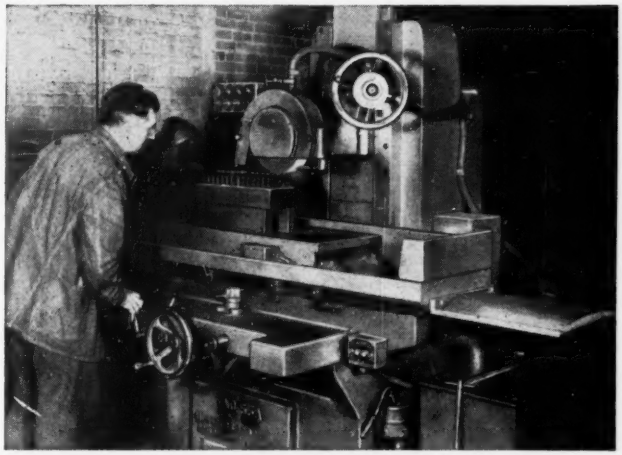


THE GAMMONS-HOAGLUND CO.

Originators of the Helical Taper Pin Reamer in 1918

MANCHESTER, 2 CONN.

Enthusiastic Customers do our BEST advertising



True Temper Corporation, manufacturers of True Temper Products, use fourteen Grand Rapids Hydraulic Feed Surface Grinders in ten of their factories. The machine shown is a 55A.

You will appreciate the micro-inch finish produced at production speeds on Grand Rapids Grinders. All Grand Rapids Hydraulic Feed Surface Grinders have these outstanding features:

1. **One-piece column and base casting for vibrationless rigidity**
2. **Precision ball-bearing spindle which is greased for life**
3. **Bijur one-shot lubrication system eliminating hand oiling**
4. **Patented vertical movement of wheel head for quick, accurate adjustments**
5. **Portable coolant tank for ease of coolant replacement**
6. **Vane type hydraulic pump for fast longitudinal table travel**

to serve you—

Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Drill Grinders, Tap Grinders, and Combination Tap and Drill Grinders.

GRAND RAPIDS GRINDERS

GALLMEYER & LIVINGSTON COMPANY

308 Straight, S. W., Grand Rapids 4, Mich.

BETTER SEEING

makes a Big difference in WORK OUTPUT REJECT LOSS COST PER PIECE

LOCALITE
THE VITAL SEEING ZONE ON MACHINE OR BENCH

Small Investment Pays Big Dividends

The faster and better a worker sees, the quicker and more accurate his production. Good light on the critical work area is his most vital tool. Only with Localites can *both* ample *illumination* and *flexibility* for position be provided to direct the right illumination *exactly* as needed for the particular task.

So small is the investment required to Localite any jobs that even a few minutes time gained each hour by faster, better seeing pays steady dividends in lower-cost production and fewer rejects.

Thousands of plants are now profiting with Localite "seeing" tools. You, too, will see a big difference with a Localite on every precision task . . . bench and machine.

LOCALITES are available in a selection of 30 models with various type reflectors, arms and bases for every industrial need.

MODEL 3267-H-174
Reflector orifice 5"x3⅞". Takes 100 watt A-21 medium screw base lamp. Double arm with 3 instantly adjustable joints. Overall length, 32¾". Wrinkled grey enamel finish. Flat oblong base. Wired with 8 ft. oil-resistant cord.
$5.56 EACH in pkg. of 6
Single Units **$6.95** ea.

MODEL 3470-P-172
Reflector orifice 6-9/16" dia. Takes 100 watt A-21 medium screw base lamp. Double arm with 3 instantly adjustable joints. Overall length 48¼". Wrinkled grey enamel finish. Circular base. Wired with 8 ft. oil-resistant cord.
$6.52 EACH in pkg. of 6
Single Units **$8.15** ea.

★ Write for free booklet on "Balanced Lighting" and complete catalog of Localite and Generalite models.

THE FOSTORIA PRESSED STEEL CORP.
FOSTORIA, OHIO, U.S.A.
Localites are available through selected distributors everywhere

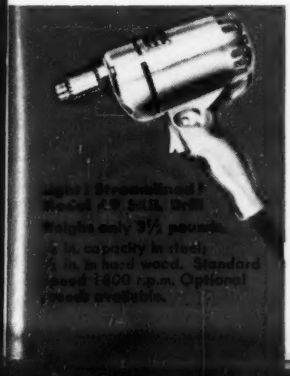
BALANCED LIGHTING
fostoria
GENERALITES for Overall Lighting • LOCALITES for Light ON the Job
Trade Mark Reg. U. S. Pat. Off.

Now the new SKIL Drill model 49

FIRST with the famous LAMB Wedge-Lock HANDLE!

TRY New Model 49 Today! Feel how scientific, patented Lamb Wedge-Lock Handle makes this great new SKIL Drill seem even lighter than it is. See how comfortably and naturally weight is spread between thumb and fingers. Feel how surely it gives safe, firm, easy control.

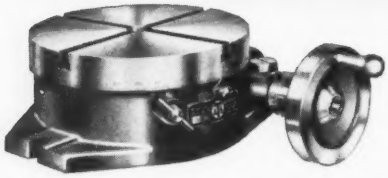
Here's a drill any operator will take to the minute his hand takes hold of it. Compact, light, tailored to meet latest aircraft industry specifications, Model 49 SKIL Drill will boost your production by hundreds of holes per day. Ask your SKIL Tool Distributor to demonstrate *today!*



SKIL Tools

SKIL Products are made only by
SKILSAW, INC.
5033 Elston Ave., Chicago 30, Ill.
Factory Branches in Principal Cities
In Canada: SKILTOOLS, LTD., 66 Portland St., Toronto

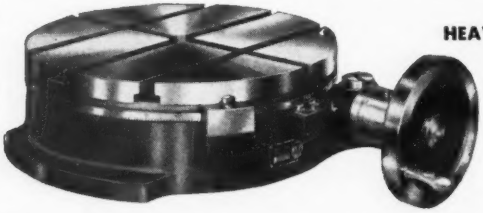
TROYKE ROTARY TABLES



STANDARD MODELS WORM WHEEL OPERATED ROTARY TABLES

Five sizes: 9", 12", 15", 18", 21".

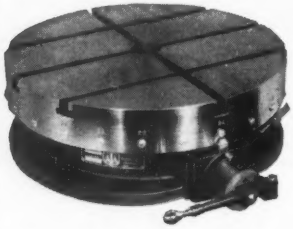
For Die Sinking, Jig Boring, Cam Milling. Indispensable in wood and metal pattern shops.



HEAVY DUTY MODELS WORM WHEEL OPERATED ROTARY TABLES

Three sizes: 18", 21", 25".

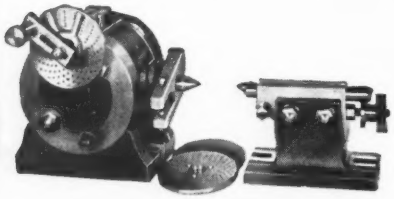
These larger, heavy duty models are used for Jig Work, Planer Jobs, and on Horizontal Boring Mills.



STATION INDEXING BALL BEARING ROTARY TABLES

Three sizes: 12", 15", 18".

These models are used for drilling and milling operations when quick and positive station indexing is required.



CARROLL DIVIDING HEADS

The illustration shows only one model of a complete line of Dividing Heads, and Spiral Driven Heads, consisting of twelve models, built in.

Three sizes: 6", 10", 12".

QUALITY PRODUCTS AT THE LOWEST PRICES

TROYKE MFG. CO., INC., CINCINNATI 9, O.

See your dealer or write for complete catalogs.

BIG VALUE IN A SMALL SWITCH

No. 6808 FOR SMALL MOTORS AND HEAVY LIGHTING LOADS

For controlling small motors (up to 2 HP) — for handling heavy lighting loads (up to 30A) — the 6808 is an old favorite with design and maintenance men. Small size and low cost make it ideal for a wide range of applications in which overload protection is not necessary. Cutaway shows these features: Bakelite arc snuffers increase breaking capacity • Kickoff release for positive, fast action • Long-lasting phosphor bronze switch blades • Heavy duty, wear-resisting, stationary contacts. 6808 is a 2 pole, 1 phase unit, rated 2 HP, 115-600V, AC or DC; 30A 250V, 20A 600V.

No. 7810 FOR USE WITH AC ONLY

The 7810 is a 3 pole, 3 phase unit, rated 2 HP, 110-600V AC; 30A 250V, 20A 600V AC. Silver, butt-type contacts give long life, accurate, positive slow-make and break action. Both models are available for surface- or flush-mounting; as explosionproof, dustproof or waterproof units. Both are no-fuse types; line is protected by normal fusing.

See your jobber — or write to Hartford — for details.

CONTROLS and APPARATUS FOR *Outstanding* PERFORMANCE

ARROW AH HART

FOR LITERATURE, WRITE
1304 HAWTHORN STREET
HARTFORD 6, CONNECTICUT

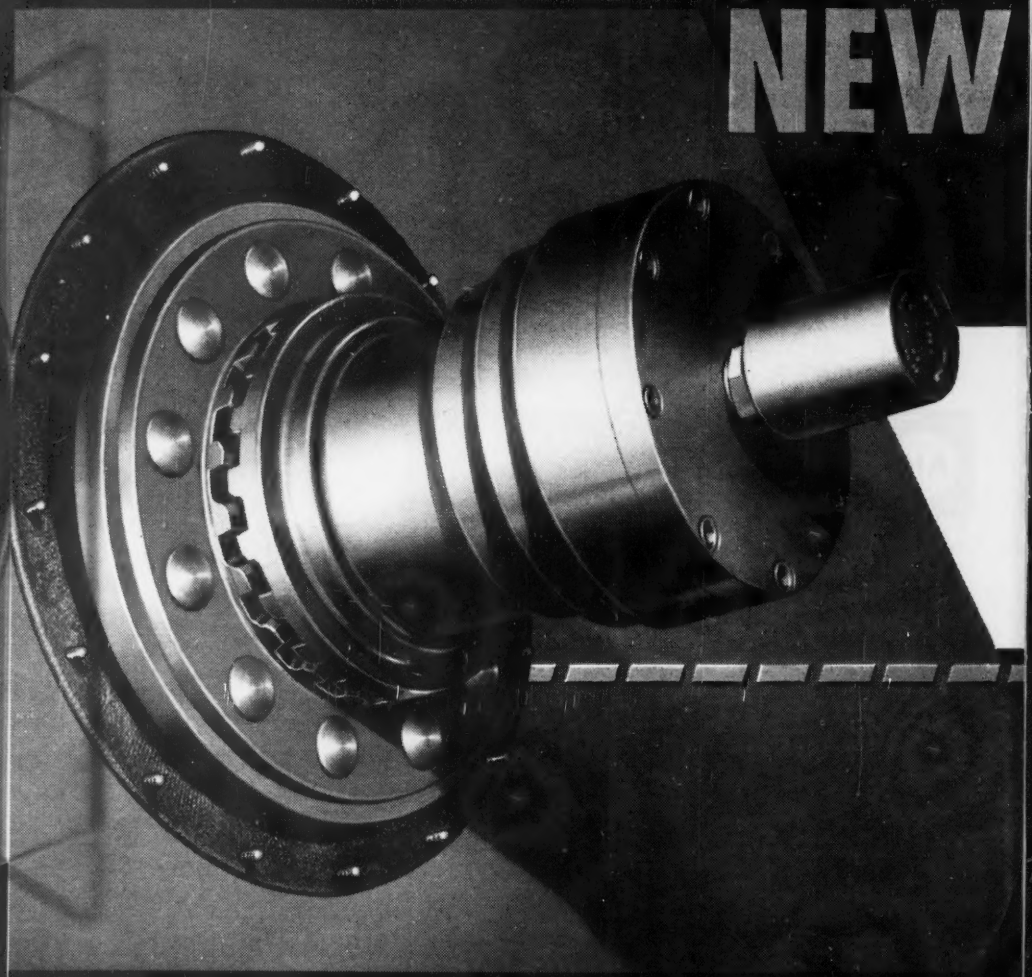
ARROW-HART

THE ARROW-HART & HEGEMAN ELECTRIC COMPANY
HARTFORD 6, CONN. U.S.A.

BRANCHES IN: BOSTON, CHICAGO, CLEVELAND, CINCINNATI, DALLAS, DENVER, DETROIT, LOS ANGELES, NEW YORK, PHILADELPHIA, SAN FRANCISCO, SYRACUSE
IN CANADA: ARROW-HART & HEGEMAN (CANADA) LTD. MT. DENNIS, TORONTO

NIAGARA

NEW



This most revolutionary improvement in press design since Niagara introduced the world famous sleeve clutch in 1934 has been in the process of development and testing for many years. It is patented and there are patents pending.

Its high hourly output . . . its sturdiness . . . its simplicity . . . its labor saving and maintenance economies . . . its safety features . . . are amazing.

ANNOUNCES

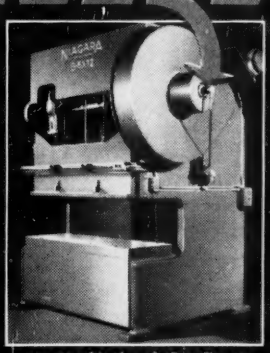
SLEEVE CLUTCH

electrically controlled air actuated

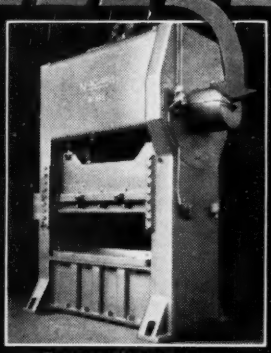
DeLuxe Control

Note each one of these outstanding features:

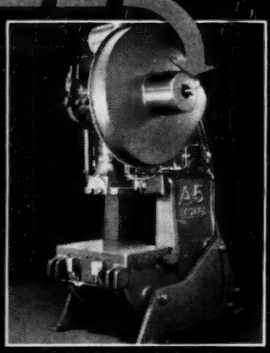
1 Has all the advantages of a friction clutch.
2 Has all the advantages of a Sleeve Clutch.
3 Can be engaged or disengaged at any point in the stroke.
4 Can be jogged through the full 360° of crankshaft travel.
5 Can be stopped instantly, regardless of position of crank, by stop button, electric eye, limit switch or high frequency electric field.
6 Can be operated by palm buttons, foot switch or push buttons.
7 Can operate single stroke or continuous.
8 Provides positive drive.
9 Has no friction members to wear.
10 Generates no heat.
11 Has low air consumption.
12 Makes instant engagement.
13 Provides effortless operation.
14 Is located on outside of drive wheel.
15 Can be completely removed without taking off the drive wheel.
16 Drive wheel next to frame . . . minimum overhang.
17 Drive wheel runs on anti-friction bearings.
18 Gears and clutch run in a bath of oil.
19 Has few moving parts. Integral jaws and splines.
20 Presses so equipped are provided with air releasing brake.



For Double Crank Gap Presses



For Straight Sided Presses



For Inclinable Presses

NIAGARA MACHINE AND TOOL WORKS, BUFFALO 11, NEW YORK
DISTRICT OFFICES: DETROIT, CLEVELAND, NEW YORK

Our Business Has Been Built on Selling Fine Chucks for Less Money

L-W 110/120 V. MAGNETIC CHUCKS

Grip Work Tightly for Wet or Dry Grinding

Guaranteed Waterproof

5¾" x 13" **$47.65**

6½" x 18" **$63.15**

8" x 24" **$109.30**

10¾" x 37" **$202.05**

DEMAGNETIZERS

A single pass over the stationary poles completely demagnetizes work. 110 volt A.C. Model B-2 for large work, 7¾" x 12½" x 6¾". Ship. wt. 55 lbs. **$63.20**

Model J-1 for small work, 7¼" x 7¼" x 6¾". Ship. wt. 35 lbs. **$41.15**

RECTIFIERS

A.C. input 110 volts. D.C. output 110 volts. P-1 for 5¾" x 13" chuck 0.8 amps. **$38.75**

P-2 for 6½" x 18" chuck 1.0 amps. **$45.00**

P-3 for 8" x 24", 10¾" x 37" chuck 3.0 amps. **$60.00**

DEMAGNETIZING SWITCHES

For 5¾" x 13" and 6½" x 18" sizes **$8.90**

Field discharge type for 8" x 24" and 10¾" x 37" **$16.25**

Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products

L-W CHUCK COMPANY 28 SO. ST. CLAIR ST. TOLEDO 4, OHIO

10" or 14"

TWIN WHEEL TOOL GRINDER

WET OR DRY

PATENT PENDING

For Carbide, Stellite, or High Speed Steel Tools.

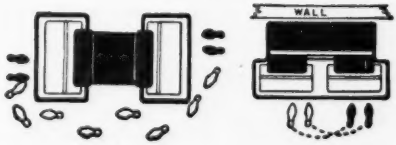
one step from rough to finish grind

Heavy Duty Wet or Dry 10" - 14" Wheels

Type 10 TD

Twin Wheel Tool Grinder

PROMPT DELIVERY



OLD WAY

Lost time between rough and finish grind.

Floor space wasted — Grinder must be away from wall.

NEW WAY

One step from rough to finish grind.

Conserve floor space — place Grinder against the wall.

See this machine in operation at Booth 965, A.S.T.E. Show, April 10-14 in Philadelphia, Pa.

WRITE FOR BULLETIN 18 TODAY!

THE STANDARD ELECTRICAL TOOL CO.

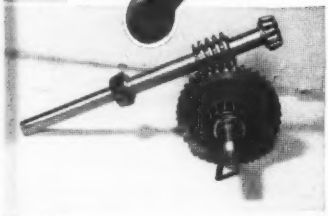
2487 RIVER ROAD **CINCINNATI 4, OHIO**

4 TIMKEN BEARINGS!

Kalamazoo

KALAMAZOO
MODELS —
816-S — 824-S
(COOLANT
EQUIPMENT
AVAILABLE)

METAL CUTTING BAND SAW



Fast cutting, accurate, ruggedly built, the Kalamazoo Metal Cutting Band Saw is substantially reducing metal cutting costs in plants and shops from coast to coast!

Typical of the sound engineering behind the smooth-cutting efficiency of the Kalamazoo is the worm gear drive unit. *Only* Kalamazoo offers an all-Timken bearing unit!

Bars, angles, tubes, pipe — the Kalamazoo cuts them all, quickly and easily, with no burr, minimum kerf. Blades can be changed in 30 seconds. Operator gets a clear, direct view of the progress of any cut. Handles 95% of cutting jobs. Easily moved by one man.

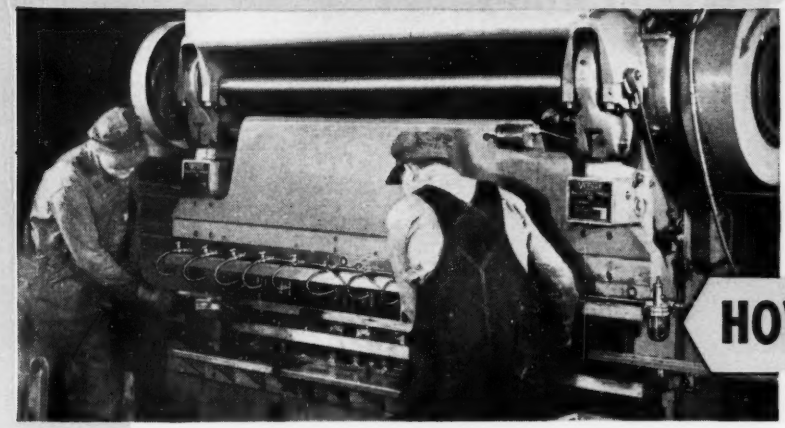
Write today for full details on the Kalamazoo — today's outstanding value in metal cutting band saws!

MACHINE TOOL DIV. *Kalamazoo* TANK and SILO CO.

422 HARRISON STREET • KALAMAZOO 16, MICHIGAN

30% BOOST *IN PUNCH PRESS OUTPUT*

Punch tool life INCREASED 50%...



See our Exhibit
Booth 635
A. S. T. E. Show

Sunlight Metal Products Corp. — Denver manufacturers of quality steel sash—did the trick! Upon the advice of a Norgren representative, they installed a Norgren Oil Fog Lubricator and a simple distribution system on a punch press — to lubricate ***automatically*** each punch and stripper unit for ***every stroke.*** Previously, the punches were lubricated by hand with a brush, only once in every ten strokes.

Here's a tip for machine designers and users to give their equipment more output and less upkeep by the simple and logical installation of Norgren Automatic Oil Fog Lubricators.

NORGREN LUBRICATORS...*are 'way out front!*

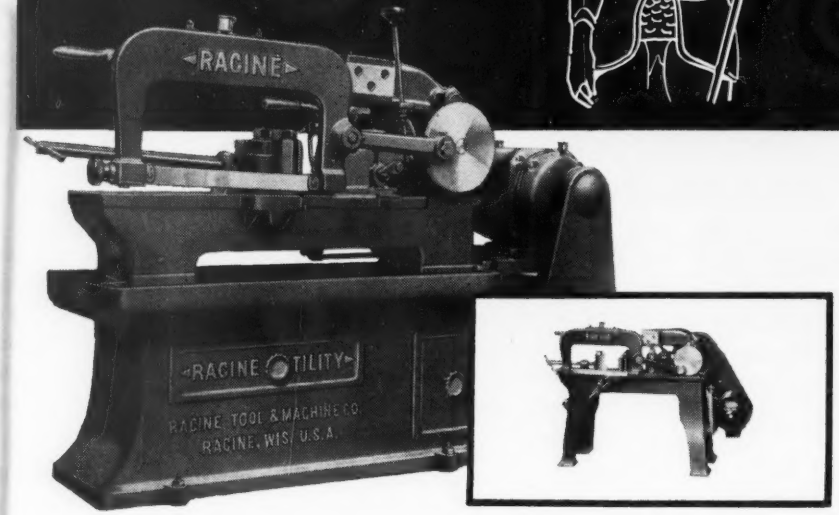
- Automatic—no attention except refilling.
- Develop an airborne Oil Fog that coats every moving part reached by air.
- Visible oil feed and (transparent bowl types) visible oil supply.
- Accurate needle-valve control of oil flow.
- Ball check hold oil in position for intermittant use, assuring oil feed the instant air flows.
- Stop oil waste; lubricate only when air flows.
- Check wear of tool or equipment in use; stop corrosion when idle.
- Compact, easy to install.

WRITE C. A. NORGREN CO.
235 SANTA FE DRIVE
DENVER 9, COLORADO

Norgren

Also Filters, Regulators, Valves, Hose Assemblies

OLD WARRIORS
ANTIQUE MACHINES
OBSOLETE METHODS--OUT



Stop the penalties, the losses, the drop in profits that old equipment costs you. Modernize the first step in your metal working processes with late design RACINE Power Saws.

A new, *all hydraulic* RACINE saw to replace worn, obsolete equipment, another unit added to your production line will pay their way in every shop.

RACINE'S line is complete — capacities 6" x 6" to 20" x 20". Single purpose and fully automatic bar feed models. A word to us about your metal cutting needs will bring carefully prepared engineering estimate sheets. Costs you nothing — can save you much. RACINE TOOL & MACHINE COMPANY, 1770 State St., Racine, Wis.

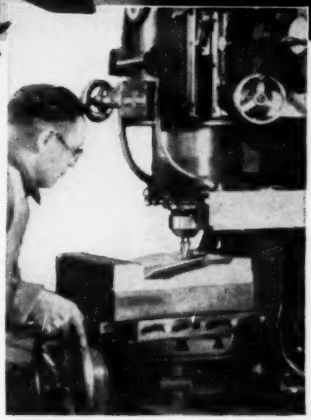
RACINE
STANDARD FOR QUALITY AND PRECISION

STANDARD FOR QUALITY AND PRECISION
RACINE
RACINE TOOL and MACHINE CO.

Faster Feed... Lower Costs!

MORE WORK BETWEEN GRINDS

T-J Die Sinking Milling Cutters "have what it takes" for cutting tough die steels with *speed* and *accuracy!* They're *extra sturdy*... hold a sharp edge longer... less breakage! Made from a standard, extremely high grade steel... properly machined... scientifically heat-treated and accurately ground. Wide range of styles and sizes ... ready for your tough jobs! Send for new catalog. The Tomkins-Johnson Co., Jackson, Mich.



This T-J Cutter at work on a connecting-rod die block for a board drop hammer. Material being milled is "Hardtem" die steel. A cutter of right design and heat treatment for this high speed work in tough die steels, making possible maximum efficiency of these machines.

FOR TOUGH JOBS SPECIFY T-J

TOMKINS-JOHNSON

DIE SINKING MILLING CUTTERS

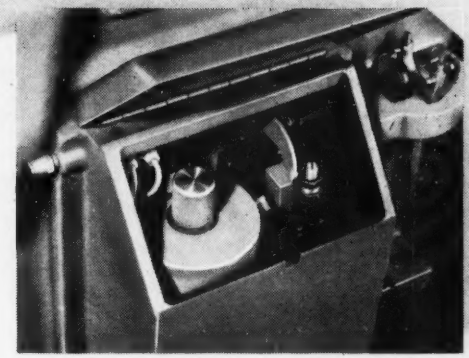
for trouble-free surface grinding under extra dusty or severe operating conditions . . .

The New 2L and 2LB Surface Grinding Machines with Built-in Protection

These new Brown & Sharpe machines have two important built-in features to insure uninterrupted production: fully automatic lubrication, and strategically-placed dust guards — both of considerable advantage in providing positive protection against dust, grit, and severe service conditions. In addition, they have the high productivity features of the popular No. 2 and No. 2B machines, and are made for precision grinding on small and medium-sized work.

CAPACITY: Grinds work up to 18" long, 6" wide, 9 1/2" high using a 7" wheel.
No. 2L (illustrated) has power feeds; No. 2LB hand feeds only.

BROWN &



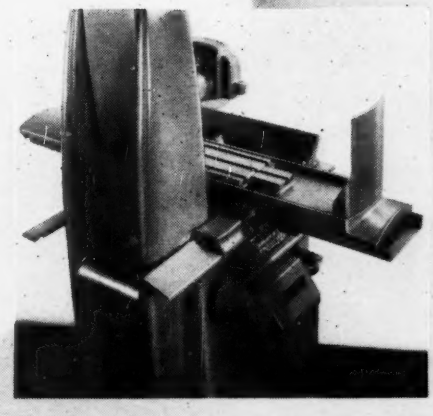
AUTOMATIC LUBRICATION!

All moving parts and adjustable surfaces automatically lubricated by plunger pump in base. Convenient sight indicator shows operation of system.

DUST PROOFED!

Table ways, saddle and upright ways completely guarded. Elevating mechanism completely enclosed.

WRITE FOR DESCRIPTIVE BULLETIN illustrating both the 2L (with power feeds) and the 2LB (with hand feeds only) Brown & Sharpe Mfg. Co., Providence 1, R.I., U.S.A.



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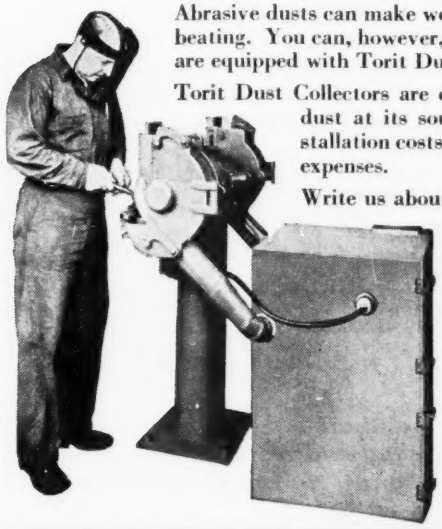

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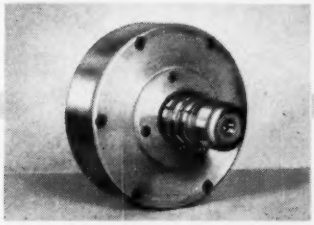

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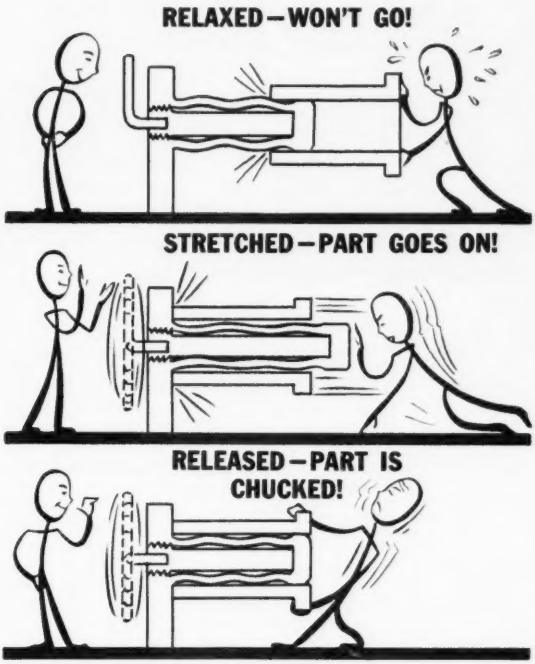

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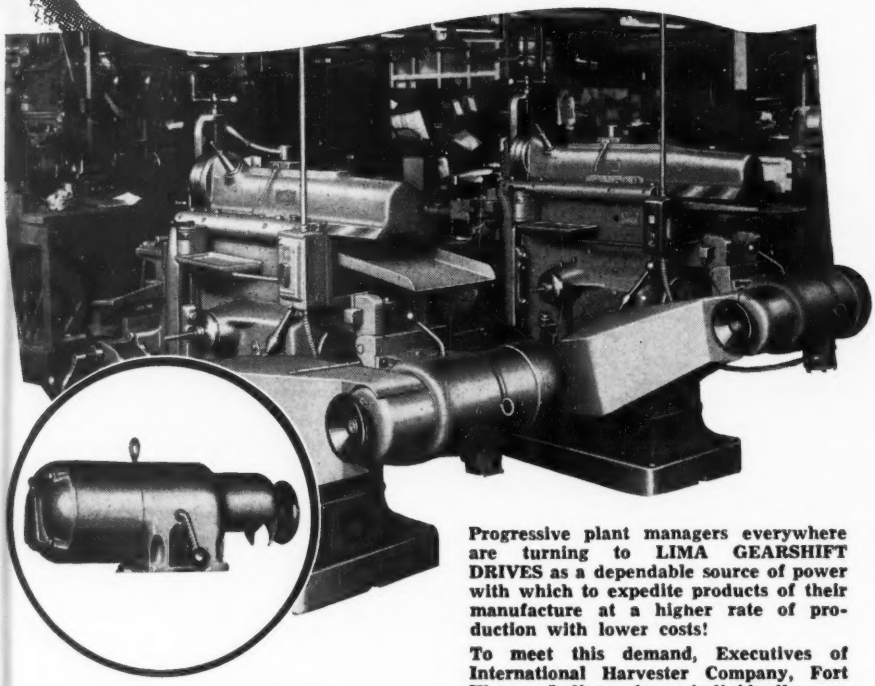

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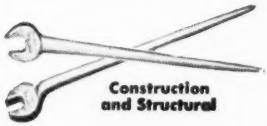
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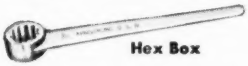
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MODERN Machine Shop

APRIL, 1950 • Vol. 22, No. 11

FEATURES IN THIS ISSUE

Electronics—A "Packaged" Metal Heating Shop *By John Evans*

A variety of metal parts are now being satisfactorily processed by means of electronic heating equipment. The author describes the operation of the equipment and several interesting applications. Page 100.

Large Shop Features Pressure Welding *By Gilbert C. Close*

Mr. Close describes the process which enables the Claude S. Slate Company to furnish critical and highly stressed pressure-welded parts to the aircraft industry, to the shipyards, and to the oil tool field. Page 116.

Work Simplification Program at Servel Pays Dividends *By Herman A. Straus*

A resume of the operation of a highly successful work simplification program. Mr. Straus emphasizes the important savings that are possible in practically every manufacturing plant. Page 124.

Analyzing Blank and Scrap Strip Developments *By C. W. Hinman*

Mr. Hinman describes a method of overcoming the problem of perforating a blank in which closely spaced holes are required. He also describes a method of computing a progressive die blank. Page 138.

Notes on Standard Elemental Data *By Phil Carroll, Jr.*

In an effort to eliminate waste motion in timestudy work, Mr. Carroll offers a logical suggestion in that basic elements of timestudy measurement be grouped and arranged in convenient reference form for everyday use. His article describes the procedure for accomplishing this result. Page 154.

Sales Hints for the Smaller Shop *By Karl F. Kirchhofer*

Mr. Kirchhofer continues his discussion on the use of direct mail as a medium of obtaining business orders. Page 180.

High Quality Forming at Less Cost

A description of the Marform process developed by Glenn L. Martin Company. Essentially, the process was designed to combine the forming ability of a steel die with the economical tooling provided by the Guerin process. Page 190.

The Eyes Have It *By H. H. Slawson*

The author describes a change in worker attitude which has been brought about primarily by making the wearing of goggles while at work a mark of distinction. Page 206.

American Society of Tool Engineers' Industrial Cost-Cutting Exposition, Page 222

Electronics -- A "Packaged" Metal Heating Shop

In which the author describes several applications of induction heating to metal parts

By John Evans
Electronics Section, Allis-Chalmers Mfg. Company

SUCCESSFUL induction heater applications for a wide variety of metal heating operations are largely responsible for the renewed confidence of industry in electronic equipment. Production men are beginning to realize that induction heaters are not "over-publicized and grossly overestimated gimmicks", but extremely versatile and practical industrial tools capable of improving over-all production methods and economies.

Versatility of application, one of their strongest endorsements, make induction heaters complete metal heating shops in themselves. For example, the same type of heater can be used in widely diversified fields from the

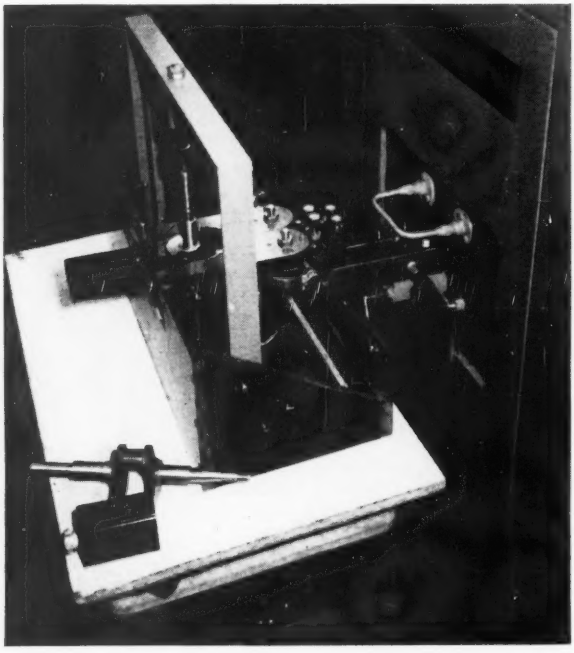

Fig. 1—Illustration showing manually operated work fixture designed for handling crank pins.

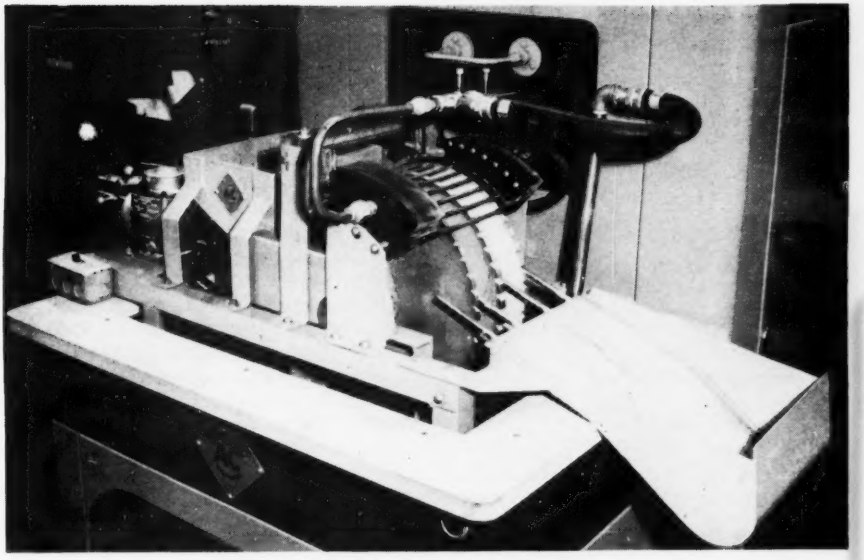

Fig. 2—View of specially designed automatic work handling fixture for valve lifting rods.

hardening of textile equipment parts to the annealing of automobile frame sections. This identical unit can also be used to heat, harden, anneal, braze, solder, fuse and melt, or any of the other different but related heating operations without purchasing additional heaters, except in cases where volume increase is desired. These changes can be made by merely making or obtaining additional coils, power control or work handling equipment, all of which can be obtained at minimum cost. Elimination of idle time, waste heat in bringing medium to proper temperature and heat loss through radiation or convection alone represent considerable economies.

Not Magic, Just Versatile

Coil changes are limited only by the imagination and ingenuity of the user or, if purchased, by the coil manufacturer. The majority of coils used to date have been designed and built by users of the equipment. This same holds true for work tables and handling equipment, which can be used for manual, semi and fully automatic operations.

Change in power input to the work can be achieved per unit of production by increasing or decreasing the production rate of the particular work, or it can be varied by the amount of coupling of the work coil and the piece being processed. Heater output can be controlled further, by input voltage variation, and also by using a variable inductor on the output circuit. These arrangements are especially practical for small shops which usually buy a heater capable of processing their largest pieces and apply any one of the available power control schemes, coils and work tables to process smaller pieces.

There are many applications where induction heating is the best and most economical method of heating metals. However, it should not be understood that it is the only method, nor always

the best. For those applications where it is suitable and installed after all factors of space, operation, production methods and economies, and so on, have been fully investigated, induction heaters cannot be matched by conventional methods for quality, quantity or economy.

Planned Applications

Case hardening of crankshafts and camshafts was one of the first important industrial applications of induction heating. The volume of induction heated parts has grown steadily, and promises to do so even more in the future. The hardening of shafts by means of induction heat and the requirement for improved hardening of these parts was brought about by the increased power and efficiency requirements of the reciprocating engine and improved gasoline. However, the necessity for it generally depends upon the type of service for which the engine is intended, although the hardening process itself will improve the quality, life and operation of any crankshaft.

About two years ago, a special split coil was developed for case hardening crank pins with high frequency (450 kc) heating to obtain a shallower and a better defined case depth. This specially designed work coil was used with a 20 kw. heater equipped with a simple, manually operated fixture which centered the piece so that heat distribution would be uniform over the entire surface area.

Heating time for the four square inch surface area of the pin was 15 seconds, with a 10-second water quench, resulting in a 0.035 inch case at 55 Rockwell C hardness. SAE 1340 steel was used in this particular application, although SAE 1141, 1045, and so on, can be used depending upon the type of service for which the shaft is intended.

Fig. 3 — (Left) Illustration showing a 20 kw. induction heater designed for heating a refrigerator part. (Inset Below) Illustration showing coil of notched brazing rings and the refrigerator parts on which the rings are used.

Fig. 4—View of operation in which commutator bars are brazed in position by means of induction heating.

Induction heater power requirement is determined essentially by the surface area of the material to be hardened. From five to ten kw. per square inch of surface is required in most cases. A sharply defined and controlled hardness pattern calls for a correct combination of frequency, heat cycle and power density. Frequency and duration of the heat cycle generally govern the case depth, while the power density more accurately defines the hardness pattern. The higher frequency (450 kc.) used in the electronic method produces a shallower case depth than a motor-generator unit operating at 10 kc. Thus, when proper combination of frequency, heat and power is used, it is possible to obtain a case depth ranging from 0.020 to 0.100 inches.

Either single or multiple turn coils can be used to harden crank pins, and can operate from heaters up to and including 100 kw. output power. The coil is water-cooled during the heat cycle and the quench block is arranged to provide for an immediate and uniform spray quench after completion of the heat cycle. Both heat and quench cycles are timed automatically by a timer which is built into the heater for either the manual or automatic fixture. Work fixtures can be improvised to fit the size and shape of the work. The manually operated work fixture shown in Fig. 1 is designed to handle production up to 100 pins per hour, with warpage and rejects reduced to the minimum.

Automatic Fixture Boosts Output

Fully automatic work fixtures may be used in conjunction with induction heating in order to obtain maximum efficiency at only nominal cost. The fixtures need not be elaborate in order to achieve satisfactory results; the simpler they are, the better they operate. Since some sort of worktable is usually required, it is best to provide semi- or fully-automatic fixtures when the nature of the workpiece permits. Hardening of valve lifter rods at a rate of one per second, or 3,600 per hour, is a good example of what a little thought to product-equipment-operation planning and synchronization can do.

Previously, these rods were made of plain low carbon steel and hardened on both ends to withstand constant pounding. In order to attain some degree of hardness, the ends were carburized, placed in a furnace, heated to a critical temperature, and then water-

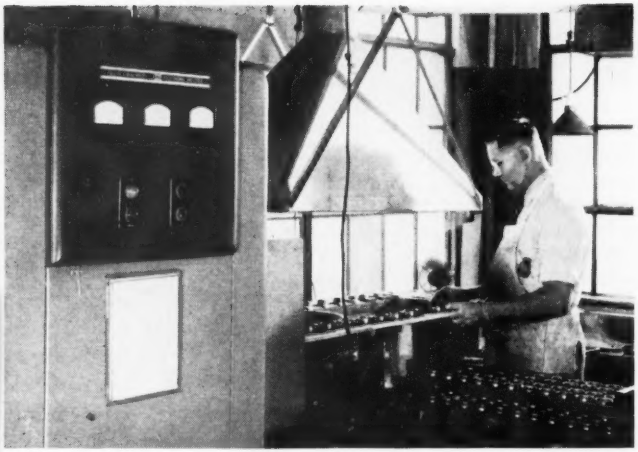

Fig. 5—An application of induction heating to the soft soldering of oil gages.

quenched for desired hardness. Warpage, scale, and rejects were common with the previously used method.

Excessive scale caused by furnace hardening was eliminated when rod ends were selectively hardened by induction heat. Using SAE 1045 steel did away with the carburizing process, although parts had to be drawn through hot oil within 30 minutes after quenching to prevent the metal from cracking from over stressing. However, this can be eliminated by using a higher alloy steel, such as SAE 1165 with oil quench. Cold drawn SAE 1045 steel rods used in this particular application measured 9¼ inches in length and ¼ inch in diameter. Rods required through-hardening for ⅝ inches each end at Rockwell 55 C or better.

The fully automatic work fixture shown in Fig. 2, consisting of a revolving drum with three ½ inch wide, slotted circular plates, carries rods from the hopper to the hair pin work coil for hardening both ends. After the heating cycle is completed, rods are quenched and dropped into a second bin, guided by four prongs extending into the rotating drum. A variable speed motor rotates the drum at any desired speed, depending upon the heat and quenching cycle required by a particular work piece. The entire operation is push-button controlled.

Silver Brazing

Each individual application of induction heat to metal heating requires close planning of product, equipment and operation. Some applications require more, others less. A third party may provide the solution to a process, as in this silver brazing operation.

A home refrigerator parts manufacturer found that manual silver brazing of noxious gas line strainers with oxy-acetylene torch and hand feeding of brazing alloy was too slow, inefficient and costly to be practical. Machine wound rings failed, too, because they were not stress relieved and tended to distort when heated. A 20 kw. induction heater, as shown in Fig. 3, and a stress relieved, notched brazing ring and specially designed work coil solved the problem.

The coil of notched rings, because they did not have to be untangled, resulted in 10 percent saving in handling time, in addition to an equal conservation of rings formerly broken in the untangling process. A tolerance of 0.001 inch in ring diameter resulted in more efficient bonding of joints. A low temperature, free flowing brazing alloy, which completes braze at a temperature of 1145 degrees F, brought material cost savings to 25 per cent over former method.

Induction heating, using the specially designed coil, provided for the brazing of 10 pieces simultaneously, raising production from 60 pieces per hour by the former method of 480 units per hour. In addition, operating costs were reduced to 25 percent of the old method on an hourly basis. Work simplification, production savings and material costs reduction were obtained because of the detailed planning of all concerned.

Bonding Problem Solved

Excessive heat generation and eventual loosening of armature bars of starting motor armatures presented another problem which was solved by silver brazing with induction heat. Because of the high speeds and currents required in the operation of modern starting motors, ordinary solder joints are subjected to such extremely high temperatures that there is constant danger of centrifugal force pulling the coil out of the armature slot. A silver brazing alloy was selected because of its electrical resistance, tensile and shear strength.

The substitution proved impractical also because the joint to be brazed had to be subjected to a temperature of 1175 degrees F. in order to melt and flow the silver brazing alloy. With ordinary brazing methods the copper in the armature coil and commutator conducted heat away, requiring extended heating of the joint area. This prolonged heating sometimes damaged the insulation between commutator bars sufficiently to cause short circuits.

Application of induction heating confines heat to a specific joint area without prolonged or excessive treatment, so that none of the surrounding parts are affected. With flux and silver alloy in place, the armatures are mounted in a jig, as shown in Fig. 3, and brazed a segment at a time, requiring from 15 to 20 seconds per segment. While the actual set-up time remains the same, induction brazing provides a means of obtaining a permanent bond which remains unaffected by the high temperatures generated in these motors under operating conditions, and it is reported that the armatures are better, both electrically and mechanically.

Mass Production Soldering Practical

Soldering is one of the newer uses of induction heating. Its advantage, like in other applications, is reflected in quality and quantity improvements, less handling, and greater material saving. At present, it is being used successfully in the metal industry, plumbing, heating and refrigeration production, manufacture of metal

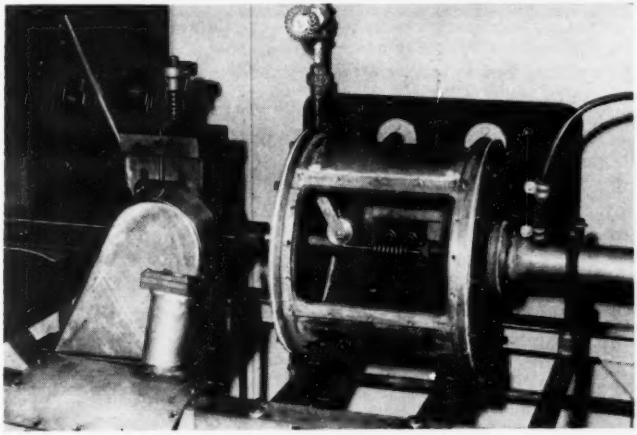

Fig. 6—Heat treating of tungsten rods which are used in the manufacture of distributor points.

furniture and fixtures, metal packaging of foods, and so on.

Induction heating produces eddy currents and hysteresis losses which can be directed into specific areas of the parts to be soldered. This heat energy can be varied in amounts through the power output of the heater, heating cycle and work-coupling synchronization of heater, coil and fixture enables expert soldering to be performed without requiring any special skill of the operator. This is especially true where soldering preforms are used or where the solder is crimped into the joint.

Application of induction heating, as shown in Fig. 5, to soft soldering of

Fig. 7—Electronic induction heating being applied to specific areas of household utensils for the purpose of stress relieving the metal.

design. Because the heat is controlled, both in location and intensity, the part to be soldered can receive heat at a rate of about 250 B.T.U. per sq. in. per minute, compared to three B.T.U. for the same period possible with a furnace whose walls are heated to 2000 degrees F. It is of greatest benefit when used with progressive work loading operations where the work enters one end of the coil, passes through it on a conveyor or rotating table, and leaves at the other end. This type of oil gages raised production over 200 percent over previous methods. The oil gage is carried past the work coil on a conveyor system and a brass diaphragm is soldered to the inside bottom of a sheet metal stamping. The fully automatic fixture enables the soldering of 1800 gages per hour and provides a better bond which makes a perfect seal. Both material handling and material cost is reduced to a minimum. Solder waste is almost entirely eliminated. Because all of the operations

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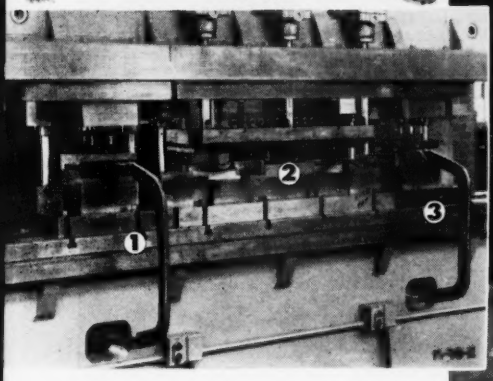

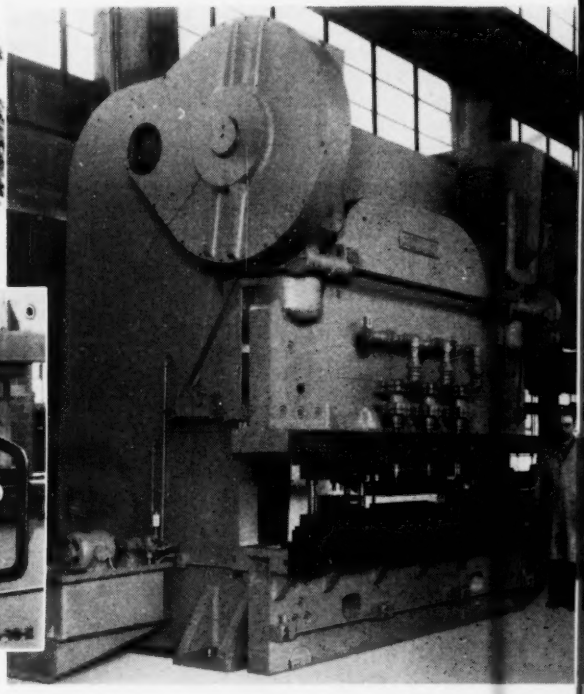

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Simultaneously punching **3** draw bars on self-contained interchangeable die sets.

1000-Ton Cincinnati All-Steel Press Brake punching 1045 H.R. Steel tractor draw bars.

The cost of two machining operations on draw bars for International Farmall Tractors was reduced from $25.26 per hundred to $2.24, by changing the method to punching on a Cincinnati Press Brake.

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are confined to the immediate vicinity of the heater, fumes created by heating of the flux can be eliminated by a simple hood built above the work table.

Tungsten Heating Stepped-Up

Heat treating of tungsten rods used in the manufacture of distributor points is one of the newer applications of induction heating. A simple spring coil and an equally simple automatic fixture, as shown in Fig. 6, proved to be more practical than previously used resistance heating.

The rods are of almost pure tungsten, a quarter inch in diameter and measure five or more feet in length. Several rods are placed in an easily improvised rack and inserted between two rollers which drive them through the work coil enclosed in a dissociated ammonia atmospheric enclosure to keep it from oxidizing. Rods passing through the work coil at a rate of 4.5 feet per minute are heated to 2300 degrees C. While at this temperature, the metal assumes an equiaxed crystalline structure.

A previously used method required very high currents and excessively high maintenance. Rejects were reduced from approximately 30 percent to practically nothing with induction heating, in addition to considerable saving in floor space and improved working conditions.

Induction Heating Cuts Crimping Losses

High frequency heating has been successfully applied to the annealing of specific areas of pot and pan rims between drawing operations. One cooking utensil manufacturer maintains an average hourly production rate of 350 units using a 20 kw. heater. However, volume varies with utensil shape and size. Manual or mechanical indexing conveyor loading can be used in this operation.

Cold metal drawing built up stresses to the extent that the metal became work hardened, a desired effect where no further drawing is necessary, but undesirable where the rim, for example, is to be crimped under for finished appearance. In the latter case,

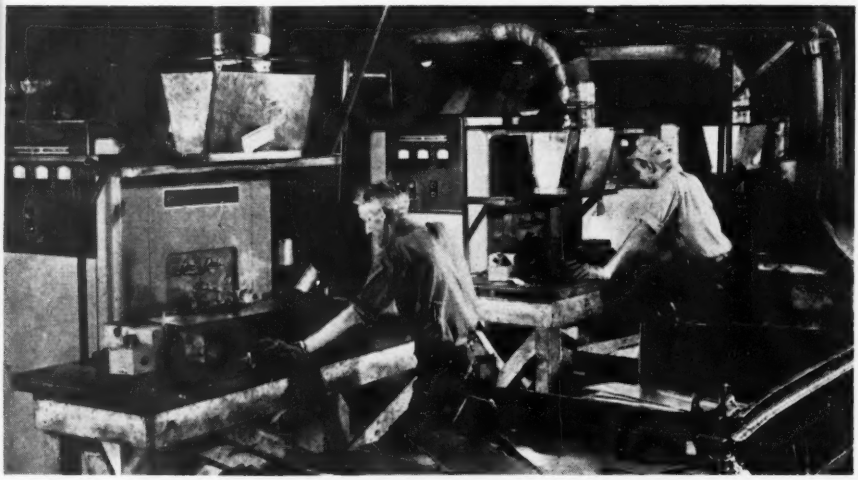

Fig. 8—Electronic induction heaters used for annealing local areas prior to forming operations.

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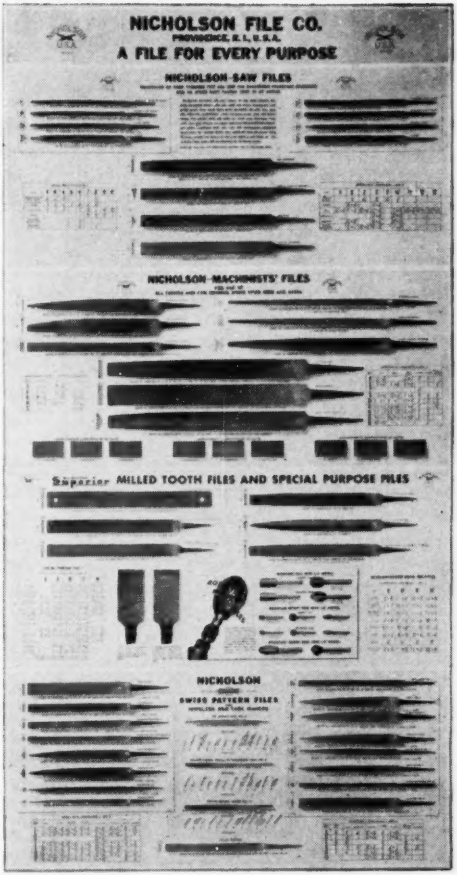

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the rim, which has been work hardened from the first drawing operation, must be annealed in order to avoid the possibility of tearing or cracking during subsequent drawing or crimping. The sides of the vessel that have been work hardened and require no further drawing give the utensil the required strength and firmness.

In order to return the work hardened metal to a more workable condition, the specific area to be drawn or crimped must be brought to a temperature in excess of 1,100 degrees F. With the use of the electronic induction heater, as shown in Fig. 7, the rim of a vessel can be brought to the desired temperature in a matter of seconds to stress relieve the metal, making it ductile again for the next operation. By this method, heat can be induced into steel at 70 degrees F. at a rate about 100 times as fast as is possible with a furnace whose wall temperature is 2,000 degrees F. This rapid heating reduces scale, distortion and rejects to a negligible minimum, and improves working conditions and product quality.

Work handling equipment for this application can be easily furnished by the manufacturer of the induction heating unit or the user. Generally, only a simple, inexpensive fixture is required, as shown in the illustration. The operator needs only to place the pot or pan against centering guides and push the "ON" button. Induced heat furnished by the R-F power is applied for a predetermined time and is automatically stopped by a timer built into the heater. The vessel is then removed and the process repeated. A more elaborate fixture than the one shown can be made which incorporates automatic features and reduces handling.

Work coils can also be built easily by the users of the heater at little cost to fit varied needs. In addition to annealing, the heater can be used for hardening, brazing, soldering, and other related operations.

Localized Annealing Pays

Steel specifications for automobile frames are as changeable as automobile styles. Consequently, frame manufacturers are hard pressed to have adequate supplies of sheet steel of desired physical qualities on hand. In many cases, steel of excessive hardness and not originally intended for forming is used, resulting in considerably increased scrap, more rejects, reduced die life, and other costly complications.

One of the costliest parts of this problem has been the reject cost of parts which crack during forming. Sometimes these rejects run as high as 40 to 50 percent. To scrap the inventory of material is prohibitive, but certain forms of heat treating can be used to change materials' characteristics to make them acceptable for use

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in the new design. Various types of heat treating practices are employed by the automotive supply manufacturers, and, in some instances, induction heating has proved to be a great time and money saver.

In an automobile frame plant, for instance, gas furnace annealing of front cross-bars, 7/64 inch thick, cost 9.86 cents per piece; 4.04 cents for labor; 5.02 cents for fuel and 0.8 cent for trucking cost. Since gas-fired annealing meant that the entire piece had to be heated in spite of the fact that there was no need for it, the major portion of the fuel cost was a complete waste.

A 20 kw. induction heater installed expressly for this purpose in the punching department eliminated the cost of handling and reduced power cost (including tube depreciation) to 0.65 cent per piece. Because of the faster, localized heating possible with the electronic heater, the man-hour production cost was reduced to 1.41 cent per piece, or a total cost of only 2.06 cents. Thus the saving accomplished by induction heating was 7.80 cents per piece. On a monthly run of 27,270 pieces, savings resulting from the use of the high frequency heating equipment shown in Fig. 8 for one month amounted to $2,126.25 over previously used annealing methods.

In other induction heater applications in this particular plant the following savings over previous methods have been obtained: normalizing forged levers, 72 percent, normalizing ⅛ inch front crossbars, 35 percent. Use of induction heaters completely eliminated scrap due to excessive hardness of steel and reduced the amount of scrap from all causes to almost nothing.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

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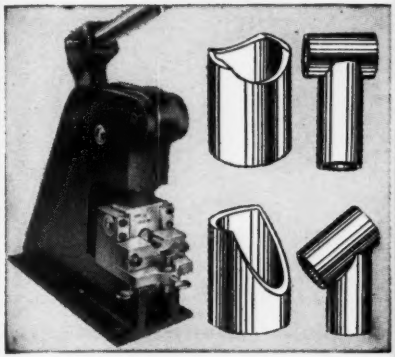
WITH
ARC•FIT



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The Arc-Fit quickly shears away the desired sections of pipe so that it will conform perfectly to the outer contour of the opposing piece, as illustrated.

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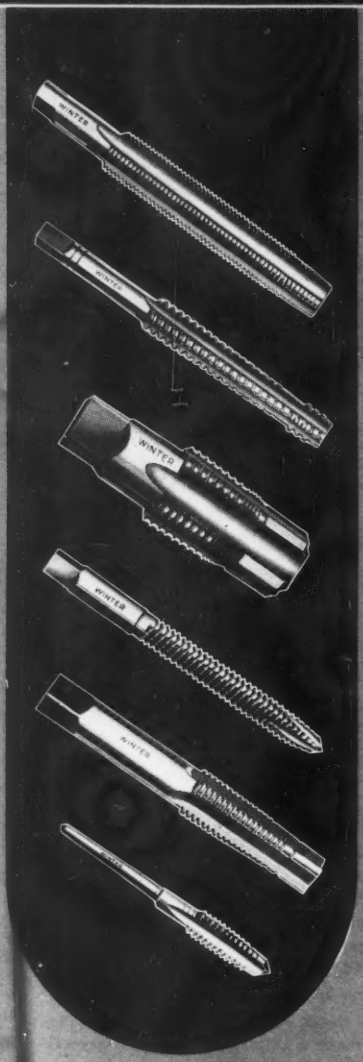
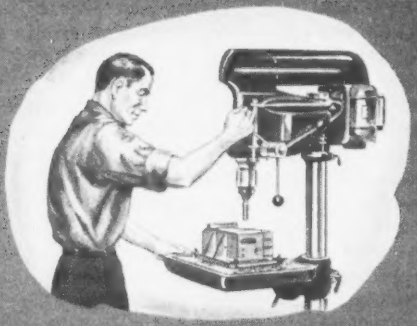


WINTER TAPS FOR SPECIAL APPLICATIONS



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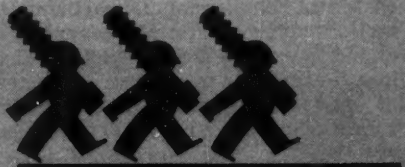

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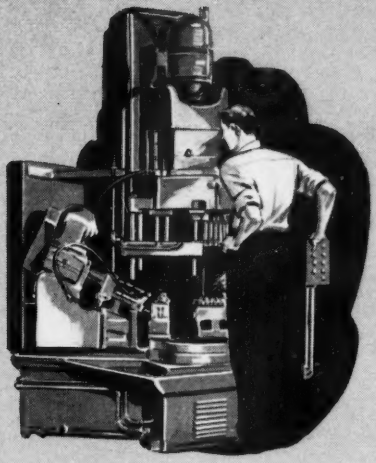

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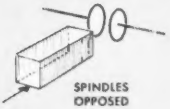

SPINDLES OPPOSED

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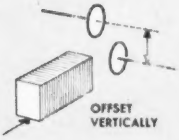

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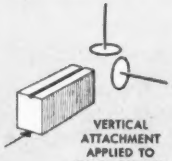

VERTICAL ATTACHMENT APPLIED TO EITHER SPINDLE

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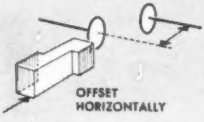

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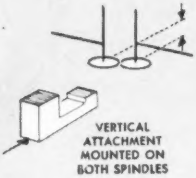
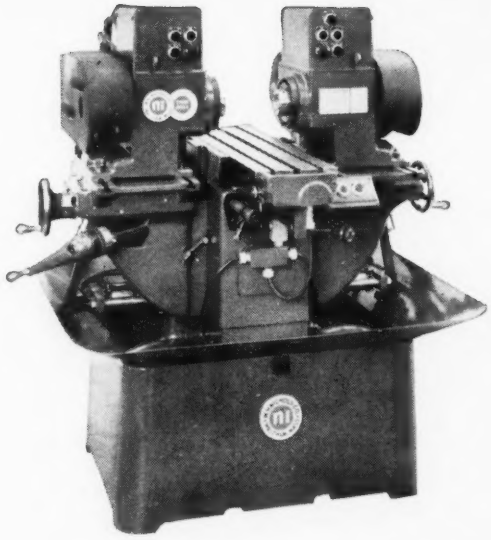


VERTICAL ATTACHMENT MOUNTED ON BOTH SPINDLES



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Motors	(two) 1 HP
Maximum height center of spindle above table	11¾"
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Floor space required	64"x56"
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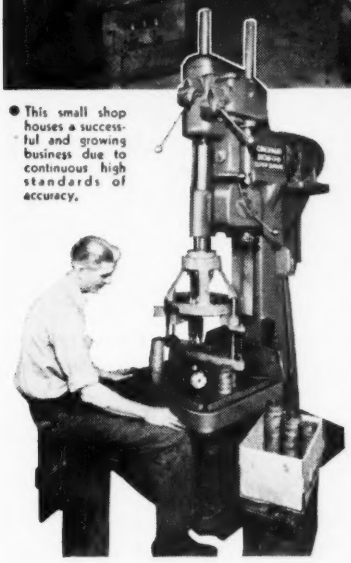

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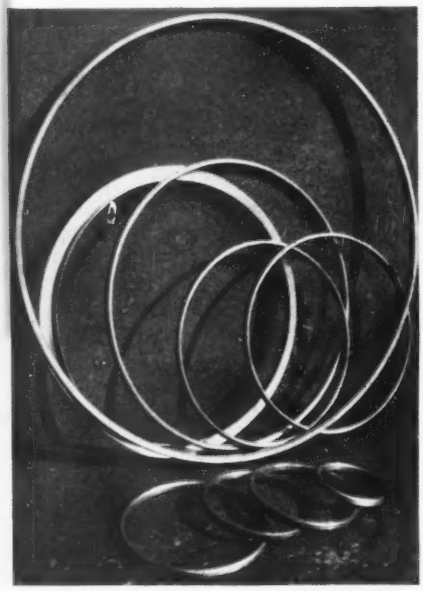
Large Shop Features Pressure Welding

Old principle of joining metals adapted to present-day production

By Gilbert C. Close

THE solid-phase hot pressure-welding process is gradually assuming an important status in many types of industry. It is rational to assume that as the peculiar advantages of the process become more widely known, it will find applications in most industries where precision and dependable welding is required. Introduction of the process to date to industry in general has depended largely on the welding job shops such as the Claude C. Slate Company, Los Angeles, California.



Typical pressure welded parts after machining. The flanged ring is an aircraft jet engine blast tube support. The other rings are high pressure gaskets. These gaskets must be held to a tolerance of .005 inch to meet American Petroleum Institute standards.

Though a relatively new enterprise, the Slate Company is already furnishing critical and highly stressed pressure-welded parts to the aircraft industry, to the shipyards, and for use in the oil tool field. Furthermore, after proving the value of pressure-welding equipment in small upset forging work, the company has received a large contract for the upset forging of the blanks from which critical, precision gears will be machined for use in a military aviation project. Award of this contract was based on the company's metallurgically demonstrated ability to maintain uniformity and evenness of metal grain flow and close dimensions on the upset forging while producing it in their pressure welding equipment.

The principle used in pressure welding is not new, and dates back to when

blacksmiths heated iron in a forge until it was slightly plastic, then welded it together by means of hammer blows. In modern pressure welding, this elementary principle is abetted by automatic control of the heat applied to reduce the metal to the right plastic state, by close fitting of the butting surfaces of the weld to eliminate air during the heating cycle, and by applying controlled pressure automatically with an upsetting machine to weld the parts together. Main advantages of the process include (1) adaptability to welding high- and low-carbon steels, (2) smoothness and uniformity of the completed weld, (3) relatively low unit cost in repetitive work, and (4) maintenance of basic metal metallurgical characteristics due to the fact that no filler metal is used. Thus when 18-8 Stainless Steel is pressure welded, the weld area retains the corrosion resistant characteristics of the parent metal.

In pressure welding, the butting areas to be welded are first machined or ground until they fit or match perfectly. The parts are then placed in an upsetting machine and the butting areas brought together under an initial pressure of about 500 lb. per sq. inch of cross section. This amount of pressure is enough to exude all air between the butting surfaces and prevent oxides from forming during subsequent heating.

Pressure welding a mild steel ring to be subsequently machined into a high pressure gasket for oil line use. The upsetting machine was designed by Slate himself, and is capable of exerting upsetting pressures of 75 tons.

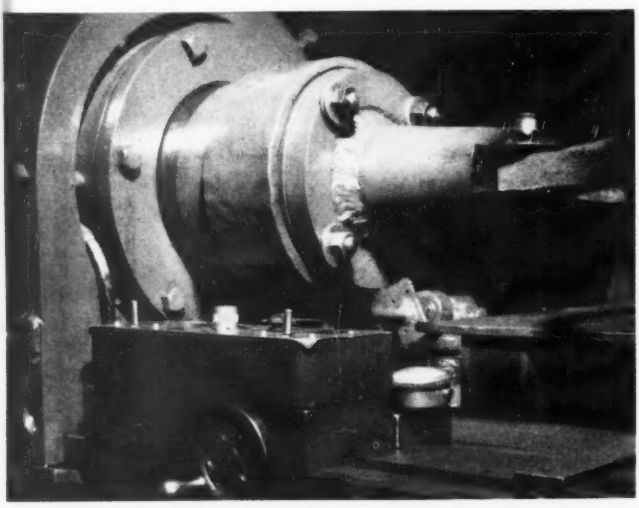
Heat is applied by means of an oxy-acetylene heating head or ring. This heating head may be circular (as used to heat butt-welded bar or square stock), or may follow the cross-sectional configuration of the weld area (such as the heating heads used in pressure butt welding of railroad rails). Blowpipes in the heating head may be varied in size according to the thickness of the metal at any particular point so that all parts of the weld area are brought to the right plastic condition at the same time. Thus in pressure butt welding of railway rails, the blowpipes heating the rail proper must be somewhat larger than the blowpipes heating the web and flange.

During heating, the heating head is moved back and forth across the weld area to assure even heating and reduction of the metal to a plastic state far enough back from the weld to encompass subsequent upset travel. When the metal has reached the proper upsetting temperature (from 2200 to 2300 degrees F. with alloy steels), upsetting pressure is applied and the weld is accomplished. Upsetting pressures vary with the alloy, but will usually run between 2500 and 4000 lb. per sq. in. of cross-sectional area.

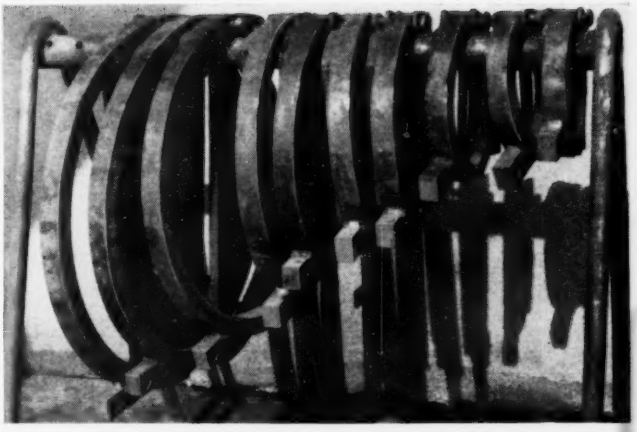
The upset metal, unlike that produced in flash welding, is even and smooth, and can be left in the "as welded" condition unless subsequent machining is necessary. Pressure weld strength with mild and alloy steels will be higher than that of the parent metal; when pressure welding Monel, or the Stainless Steels in the 300 and 400 series, weld strength will average about 85 per cent that of the parent metal. Rejects are few. In 3000 pressure welded parts produced at the Claude C. Slate Company, less than 2 per cent were rejected by Magnaflux inspection, and a large majority of this overall percentage was in stainless steel.

Slate points out that this weld consistency is due largely to the fact that no filler metal is used which might alter the alloy characteristics of the metal, and that no oxide line is formed through a properly executed pressure weld such as is common in flash and fusion welding. Also, because of the relatively low temperature required to reduce the metal to a plastic state rather than a liquid state, there is less metallurgical disturbance involved.

The majority of pressure welding work accomplished by the Claude



Detailed view of the pressure head on the upsetting machine. Control box is at lower left. A calibrated scale is used for coarse control of upset travel. The dial indicator (right end of control box) is used for precision travel control. Note mounting of "C" type jig in pressure head jaws.



Jigs for pressure welding rings are available in graduated sizes.

C. Slate Company at this time consists of butt-pressure-welding bar stock, either square or round into closed metal rings. In some cases these rings are subsequently machined into circular aircraft compounds. One such machined component is a flanged support ring, approximately 18 inches in diameter, used as a support for jet engine blast tubes. Other pressure-welded rings, after being shaped in a triangular form, are used in the "as welded" condition as "handling rings" in shipyard and oil field rigging. It is obvious that in such applications weld strength and dependability is a major consideration.

Slate designed and built his own pressure-welding equipment. The upsetting machine is hydraulically actuated, and capable of delivering a total upsetting pressure of 150,000 pounds. Precision controls permit application of the desired upsetting pressures, and automatic stops provide precision control of upset travel. Flow meters control gas supply to the heating head so that constant time-temperature charts can be developed for different jobs.

Jigs used in welding the closed rings are shaped like a letter "C" with a hinge in the middle of its back. Attachment facilities are provided on the open side of the jig for mounting it between the pressure heads on the upsetting machine. Closed rings such as these would be very difficult to flash weld due to the huge amount of bypassed current through the unbroken body of the ring.

Immediately after pressure welding, rings to be machined into circular parts are flash-heated to a red temperature, then trued by forcing them downward over a tapered, round mandrel. This not only trues the ring's circular shape, but provides a severe tension test on the weld itself. After truing, the rings are furnace annealed prior to machining.

The amount of upset in pressure welding is about equal to the burn-off in flash welding, Slate points out. This depends on the wall thickness (of hollow components such as tubes) and cross-sectional area of the part. The match between the abutting areas to be welded is less critical with solid mild steel, but becomes more critical with the alloy steels and tubular parts. Just prior to welding, both abutting areas should be thoroughly cleaned. This is accomplished at the Slate Company by wiping the areas with a swab saturated with ether.

In a weld area hardness survey using SAE 3140 steel, in the "as welded" condition, hardness varied from 87.8 Rockwell B in the parent metal to a maximum of 98 Rockwell B in the

Detailed view of a jig used in pressure welding a ring.

hardest portion of the upset metal. After flame normalizing, this variation was reduced from 84.9 to 87.2 Rockwell B. Furnace normalizing produced a further reduction of from 82 to 84 Rockwell B.

A machined pressure-weld cannot be detected by the eye alone. Etching the machined surface will bring out the curved metal grain flow lines caused by upsetting, but even then there is no clean demarcation through the weld. When a pressure weld is properly executed, there is no chance for the inclusions that haunt fusion welding, and gas and blow holes are effectively eliminated by the pressures used in upsetting.

Portable pressure welding equipment has proved its value in the field. Many oil pipelines and an increasing number of railroad rails are being butt-pressure welded on location. Unlike fusion welding (either gas or arc) which must be accomplished progressively, it requires no more time to pressure weld a 48-inch pipe with a ½-inch wall than it does for a 2-inch pipe with a ½-inch wall. This is because the entire weld area is brought to the plastic condition at the same time.

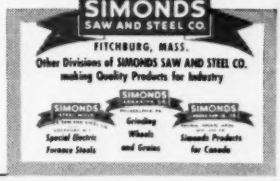
Machines used for applying upset pressure will vary according to the type and quantity of work they must do. Some upsetting machines are commercially available; others used with equal success have been designed and built by company tooling engineers. Even small, hand-operated platen presses have been used for pressure-welding valve stems. The pressure can be applied directly from each side of smaller parts. Continuous parts, such as rails, steampipes, or oil line pipes, require the use of a side-gripping machine.

Upset forging on pressure-welding equipment is but a variation of pressure welding itself. The part to be upset is placed in the movable pressure head of the machine and heated with the same type circular heating head. The heating head is oscillated from the end of the part back far enough to bring the desired amount of metal to a plastic condition. When the right temperature is reached, the part is upset against a flat cold mandrel installed in the stationary head of the upsetting machine. If desired, the metal can be upset into a die of the desired shape, thus saving material and minimizing subsequent machine work.

The five principal variables involved in pressure welding are: (1) pressure required, (2) upset in inches, (3) acetylene flow, (4) oxygen flow, and (5) time. These will vary with work of different sizes and different shapes. But all, including the time element, can be

These RED TANGS Mean More File-Mileage

There's no other file like a "Red Tang" File, because: 1—It's the only file made to Simonds' single standard of quality. 2 — It's the only file made with teeth designed like Simonds Metal-Cutting Saw teeth . . . teeth that *cut* instead of scrape. 3—Every "Red Tang" File is *individually* hardened, brine-quenched, and straightened. Prove Simonds Consistent Cut-Ability for yourself. See your Industrial Supply Distributor.



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HARTFORD Special

The HARTFORD SPECIAL MACHINERY Co., Hartford 5, Conn.

reduced to constants for the same type of work. To accomplish this, flow meters are required on the gas supplies, and the upsetting machine must be

Typical pressure weld. Upset metal need not be removed unless subsequent use requires it. Visibility of the weld line is surface-deep only. The weld line cannot be seen after machining or grinding.

equipped with maximum pressure controls and automatic stop devices. With this type of equipment, and once the constants have been established, pressure welding can be accomplished by anyone with ordinary experience, and results will average above those procured by the most experienced workman using flash welding or fusion welding equipment.

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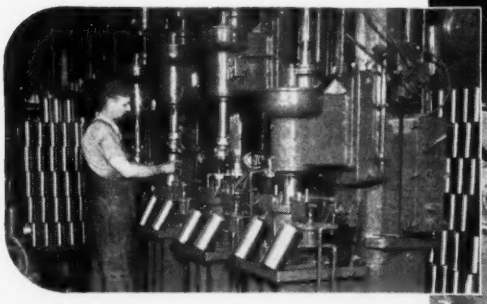
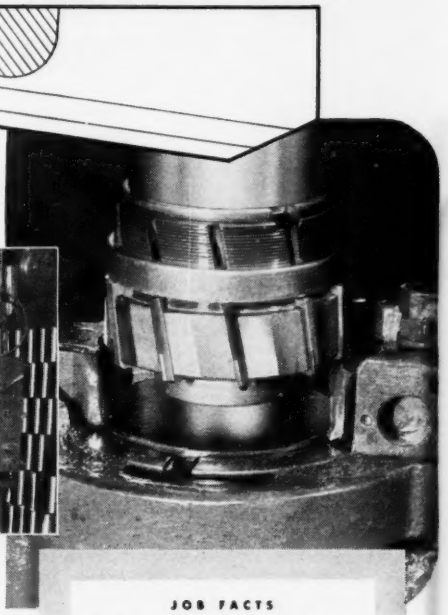
FOR CYLINDER LINERS





These Barber-Colman Inserted Blade Reamers are producing truck cylinder liners with accurate, straight, round holes, free from welts or taper, at a tool cost of 15% less than previous records. Material reamed is cast-iron.

Replaceable blades with carbide-tips give long life to the reamers, and cutting edges which stand up under continuous production. 675 more pieces per set of blades are now obtained, and tool cost per 100 liners has been reduced from $1.57 to $1.32.

When you want dependable low cost production from the cutting tools used on your machines, specify "Barber-Colman JOB-ENGINEERED".

JOB FACTS

Operation — Finish ream cylinder liners
Material — Cast Iron, 45-55 R.C.
Stock Removed — .018"
Tool Life — 108 pieces per sharpening, formerly obtained 95
Feed per Rev. — .087" Speed — 40 RPM
Tool Cost — Per 100 pieces, reduced from $1.57 to $1.32

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BARBER COLMAN

Herman A. Straus

Work Simplification Program at Servel Pays Dividends

In which the author describes the highly successful program adopted by Servel, Incorporated

By Herman A. Straus
Supervisor of Work Simplification, Servel, Inc.

HOW would you like to wake up tomorrow morning and find out that you are rich? I don't mean an oil well in the back yard, the death of an unknown relative, or a sudden rise in the stock market. These would be fine, but you can't depend on them. You can, however, count on the wealth of ideas that are locked in the minds of your employees. Industries can hit the jackpot when they wake up to the value of these ideas, furnish the means to corral them and the key to open the gates to let them out. Some concerns have already made this discovery and are doing something about it. Servel is using its Work Simplification program to bring out latent ideas and to help

Fig. 1—View of group engaged in Work Simplification training

WORK SIMPLIFICATION COURSE
OUTLINE OF SESSIONS

SESSION NO.	DATE	PREPARATION		NEW TOPICS
		PRACTICE PROJECT	READ CHAPTERS*	
1				Introduction, Check List, & Possibility List
2		Possibility List	1, 2, 3, & 4	Possibility Guide
3		Possibility Guide	5	Product Process Chart
4		Product Process Chart	6	Process Diagram
5		Process Diagram		Improved Product Process Chart & Process Diagram
6		Improved Product Process Chart Process Diagram	7 & 8	Operation Chart & Man Process Chart
7		Operation Chart	9	Principles of Motion Economy
8		Improved Operation Chart	10	Methods of Timing & Form Project Groups
9		Select Final Project	11 & 12	Time Charts & Simo-Charts
10	DATE / HOUR	Work on Final Project		Individual Instruction on Simo-Charts
11		Work on Final Project	13	Standards
12		Complete Final Project	14	Final Project

* *"Systematic Motion and Time Study," by M. E. Mundel (Prentice-Hall, Inc. 1947).*

Fig. 2—Reproduction of chart outlining sessions of Work Simplification course.

generate new ones.

The assumption that your employees have ideas which can be put to practical use is not far-fetched. Most people think, and their primary concern is themselves. Few people like to work, especially when they have to—and that's the way it is with most of us. Put these things together; and the logical answer is that most people think about how to make their work easier. These thoughts, if captured and used, can be expected to result in increased production at decreased cost. It is almost axiomatic that when men's work is made easier, their efforts will be more productive; and when they themselves originate changes to improve their jobs, the new method is practically certain to be welcome and made to work.

In the summer of 1948, Mr. Louis Ruthenberg, who was then President of Servel, Inc. and is now Chairman of the Board and Chief Executive Officer of the corporation, brought Dr. Marvin E. Mundel of Purdue University to Servel to conduct the original meetings which set the pattern for our subsequent work. Sixteen of our top executives, including Mr. Ruthenberg, completed twelve three-hour sessions with Dr. Mundel and spent additional time working on projects. This was done to give them a thorough knowledge of Work Simplification, and to permit them to determine its potential value for the company. They gave it their wholehearted backing, and decided that a Work Simplification program should be installed in the plant. It was welcomed because top management

had set the example for the entire organization by going through it first themselves. It was continued because of the enthusiasm of the men who took the training subsequently. Since the second group was trained, the program has been modified to suit our particular operations, and all training has been done by our own personnel. The course has been developed primarily for men having to do with manufacturing, but men from other divisions who have been trained have been able to apply work simplification principles and make improvements. A special course for office personnel is now being considered and probably will be arranged in the near future.

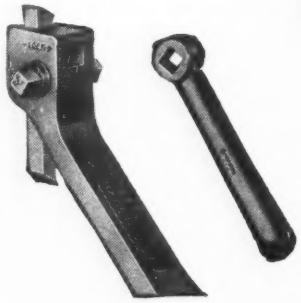
Figure 1 shows a view of a group which was in training as this article was being written. These men are supervisors representing the engineering, inspection, time study, service manufacturing, production, plant engineering, and office management divisions of the company. Men from all other divisions of the company, including the sales and treasury divisions were in other groups. Figure 2 is a schedule of the two-hour sessions, and the preparatory work that each participant is required to do. Some of the projects on which these men worked during their training resulted in substantial savings. Can you think of any other training programs that can be conducted at a handsome profit?

One foreman selected a job immediately outside of his own office to analyze for a practice project. It was a job that he looked at frequently, but seldom paid any attention to. He saved three hours time a day for the man doing this work, and there are two more jobs just like this one in his own department—a total saving of nine hours a day in direct labor on each shift.

Another foreman, for a practice project, analyzed an assembly opera-

STOP...

TOOL CHATTER



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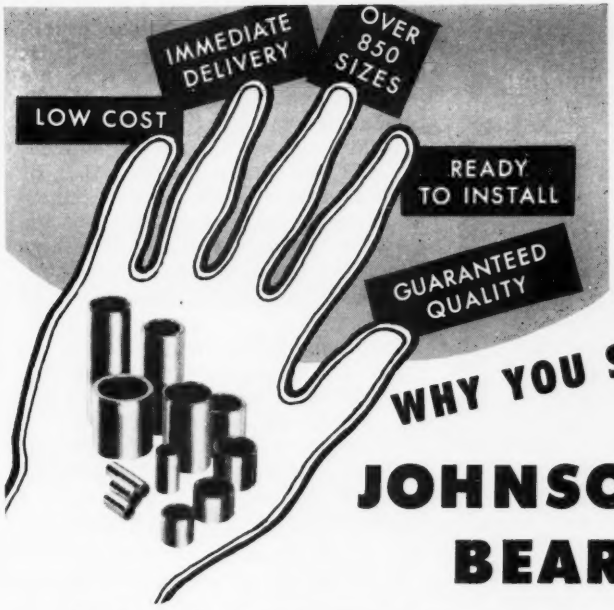

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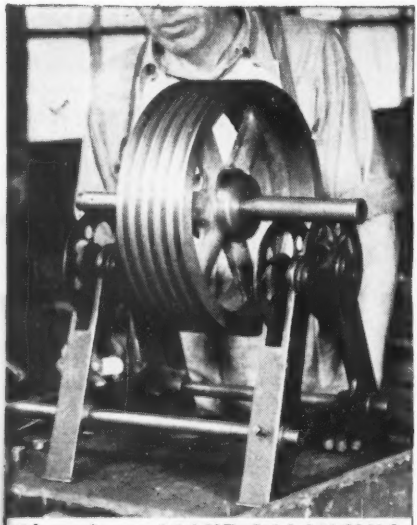

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CAPACITIES

Swing	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

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tion that had been giving him trouble. It was a job that he knew well. He had devoted much time trying to improve it, and had finally come to the conclusion that the trouble would be with him as long as this model existed. The systematic analysis that he made after having had work simplification training resulted in his proposing a change in design. The new design was adopted. It corrected his difficulties, and saved the company $8,000 a year.

Two supervisors made a crew analysis of a three man job with the idea of installing a bridge crane to do lifting so that one man could be relieved for other work. Their analysis showed that the work could be arranged so that two men could do it easily, and the bridge crane was not even needed.

In these actual examples it is worth noting that these men made their own improvements. Men are as energetic in making their own ideas work as they are in resisting changes proposed by others. Taking advantage of this psychology is part of the underlying philosophy of modern work simplification.

Many concerns encourage their employees to submit their ideas for improvements by offering cash awards, bonuses, special recognition, prizes, and so on. These are good, and in some cases are very effective, but they are not enough. Management must help its employees find out that systematic thinking is more productive of results than undisciplined ingenuity, and then must give them the tools to aid in organizing their creative powers. Work Simplification is such a tool.

Experimentation, development, and progress often are sustained by curiosity. Because everything is new to children, they are curious and learn with amazing rapidity. A new product of our own, or a competitor's product with which we are unfamiliar usually invites and gets our closest scrutiny. We are curious, so we investigate.

Specify:

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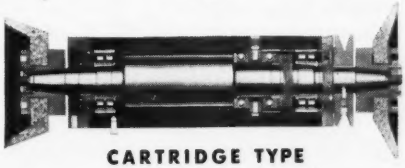
POPE PRECISION SPINDLES with *two* double-row, *super-precision,* cylindrical roller bearings and *two* separate ball thrust bearings



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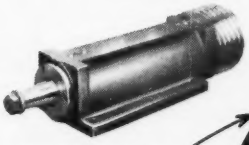

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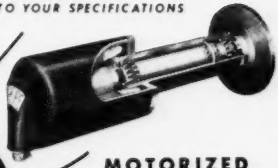

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Why:

Because POPE Precision Spindles have more radial and axial rigidity to support the modern, high production cutting tools used for boring, milling, drilling or grinding.

1. POPE Spindles are dependable and trouble-free. *They revolve accurately under the heaviest loads.* This means continuous production of accurate parts.

2. POPE Spindles eliminate chatter. There are no internal clearances between the rotating parts. But there is an internal preload which assures accurate centering of the shaft without depending on the maintenance of an oil film.

3. The indicator readings taken on the noses of thousands of POPE Super-Precision Spindles show less than one half of one ten thousandth (less than 50 millionths) of an inch.

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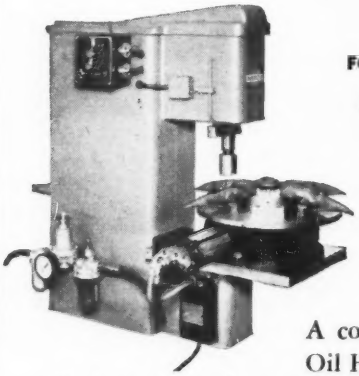
BUILDERS OF PRECISION SPINDLES

When we are accustomed to things we take them for granted and are likely to ignore them. We are often satisfied with our present methods because we remember what great improvements they were. We frequently pass by our current products without even a casual glance. We need something to arouse our curiosity about these things. We must see them as if they were new, and observe them as an outsider would.

During their Work Simplification training men were required, for their practice projects, to observe systematically and to chart their observations. They rapidly developed the habit of vigilant perception and became aware of much they often looked at, but never saw. Without exception they found things they did not know were being done. They found others that were being done differently than they were intended to be, and still others that were supposed to be done but had been discontinued. These experiences have aroused their curiosity about all jobs, and they readily admit it.

The "Possibility List" and "Possibility Guide" are the first two practice projects listed on the Outline of Sessions, (See Figure 2). They were introduced at Servel by Dr. Mundel who originated them. They are not as well known as the other techniques, and we have found them to be of great value.

A "Possibility List" is a written list of ideas about any subject, part, or process. There is nothing new about writing a list. Our wives usually do it before they go shopping. Actually writing such a list often brings to mind many things which otherwise might have been forgotten. The same thing occurs when we list ideas—it helps to generate new ones. Each separate idea is listed only once and is not elaborated on. This makes us search for many ideas, rather than to contemplate only one idea and its rami-



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A compact, inexpensive, simple air operated Oil Hydraulic Press with only 2 moving parts. Both stroke and pressure can be accurately regulated. Non-varying hydraulic pressure is uniformly applied and not affected by stock tolerances, thus eliminating breakage. 2½ and 5 ton capacity. *Write today for Circular M49.*

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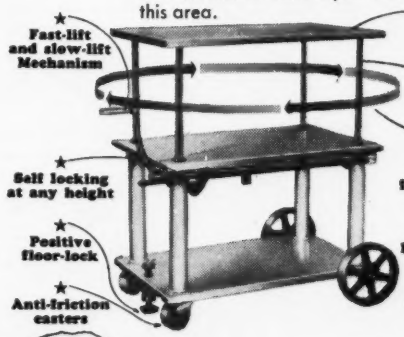
Cut the costs

THAT COLLECT
TWO FEET ABOVE THE FLOOR

Watch, for a while, the heavy loads that are moved, elevated, and lowered in the horizontal space between 24" and 42" above the floor. Watch the stock feeding operations, the placement and removal of dies and fixtures, the assemblies and repairs which take place daily within this area.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Three table surfaces
Four point support
May be worked-at from all sides
One man can safely lift and carry loads usually requiring the strength of four

How efficiently and safely are these operations performed in **YOUR** *plant?* Would increased efficiency here tend to reduce unit costs? industrial injuries?

PORTELVATOR® *the Handy Hamilton Portable Elevating Table,* is height adjustable within this vital area, and rolls smoothly in a horizontal plane on anti-friction casters and wheels.

STRONG AS AN ELEPHANT

COMPACT AS A PONY

Three standard table models with capacities of 1,000 to 5,000 pounds. Hundreds of special models now performing out-size or unusual jobs in the country's most progressive plants. *Our new Portelvator Bulletin, which gives full specifications and points out many uses, may be had free.*

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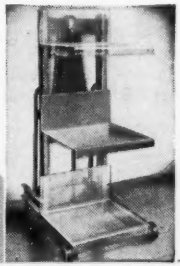

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For extra high and extra low operations. Capacity 1,000 pounds. Platform travel from 6" to 58" above floor level. Manually operated.

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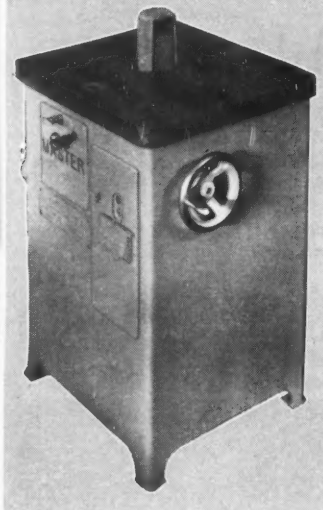
fications. Many experienced men observe methods with a view to improving them and lose interest in further observation as soon as a good idea presents itself, but we all know that the first good idea is not always the best. The use or a "Possibility List" forces consideration of further possibilities even after we have uncovered what appears to be a practical idea, and helps us capture those fleeting thoughts which might be lost unless they were written down. Ideas are put on the "Possibility List" without regard for their consequences. This is to avoid ignoring ideas when past experience tells us "It won't work." Telephones, railroads, steamboats, air brakes, iron ships, automobiles, airplanes, electric lights, steel-frame skyscrapers, and even the iron plow were ideas that were vigorously opposed because people knew they wouldn't work.

Ideas are transferred from the "Possibility List" to the "Possibility Guide" and entered according to the highest numbered area of change which they affect. These areas are 1—Motion Pattern, 2—Tools, Workplace, and Equipment, 3—Sequence (of operations, moves, storages, or inspections), 4—Product Design and 5—Raw Material. As each item is entered on the "Possibility Guide" the probable effect that it will have on the other areas of change is noted. The "Possibility Guide" shows ideas in an organized manner. This facilitates selecting those ideas which hold the most promise and should be investigated first. It helps us to determine an objective—and we must have a goal for which to strive or our efforts will be random and may be ineffective. Without a star to which we can hitch our wagon, progress is likely to be by accident rather than by intent. Such accidents are rare.

A man in one group selected the household gas refrigerator fuse pipe

Presenting **THE NEW MASTER PROFILE GRINDER**



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Large Table ***Dust Collecting Facilities***
Guarded Wheels ***Oscillating and Non-Oscillating***

The Master Profile Grinder is an entirely new development in the metal grinding field. A tilting spindle with an incline range of from 90° to 60° is the outstanding feature. The table is constantly in a horizontal position. A precision protractor, read by means of a dustproof lighted periscope from the top of the table, permits setting to within one-quarter of 1°.

The large cast iron alloy heat-treated table measures 24" x 25".

Write today for complete information on this outstanding grinder. It can do close, accurate work quickly on a wide range of metal working jobs.

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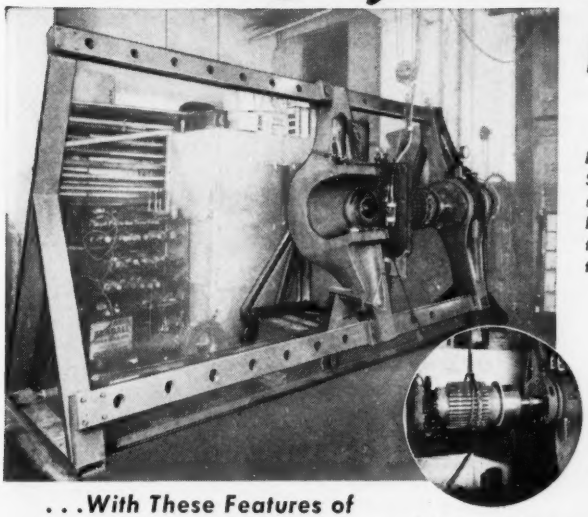
New Rodgers FORCING PRESSES



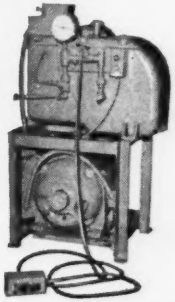
Rodgers 300 Ton, 75° Inclined, Stationary Forcing Press, one of many in the complete Rodgers line. In the application shown, the press is being used efficiently to press an armature shaft.

. . . With These Features of Construction and Operation

SEPARATE PUMPING UNITS—Choose from individual hand-operated or power-driven pumps to operate any model Rodgers Forcing Press. **REMOTE CONTROL OF POWER PUMPS**—Operator can control press from any desired position. **REMOVABLE HYDRAULIC CYLINDER**—Cylinder is easily removed from head member to permit servicing or use for other power applications. **INDIVIDUAL FRAME UNITS**—Tracks, tension bars, abutment member and head member are all separate units to facilitate handling and erection of press. **EXPERTLY ENGINEERED AND CONSTRUCTED**—All units of Rodgers Forcing Presses are made strong, durable and dependable to give years of reliable service.

. . . In These Types and Sizes

Rodgers Versatile Forcing Presses are available in portable or stationary models—horizontal, vertical, 75° or 90° inclined—100 to 600 tons—with hand-operated or power-driven pumps. In this broad selection, you'll find the ideal press to meet your requirements.



Separate Power Pump

Select your press operating unit from hand-driven pumps or power-driven pumps. Shown is a Rodgers 2-cylinder Power Pump with remote control.

Send for New Catalog

For full details and specifications on the complete line of Rodgers Forcing Presses send for Catalog 315.

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HYDRAULIC POWER EQUIPMENT

CLASS OF CHANGE	POSSIBILITY GUIDE	PART OR ASSEMBLY NAME: FUSE PIPE			PART NO: 4674–10
		OBJECTIVE: IMPROVE DRILL & TAP OPERATIONS			
		ANALYSIS BY		DATE: 3/17 1950	SHEET 1 OF 1
	MOTION PATTERN	TOOLS, WORKPLACE AND EQUIPMENT	SEQUENCE	PRODUCT DESIGN	RAW MATERIAL
1	REDUCE MANUAL WORK	REPLACE SCREW CLAMP WITH CAM OR AIR CLAMP			
	ELIMINATE	APPLY CUTTING OIL AUTOMATICALLY			
2	NEW	TWO SPINDLE HEAD, AIR FEED & DUAL PROGRESSIVE FIXTURES			
		USE DIAL FEED ON TWO SPINDLE DRILL PRESS			
3	ELIMINATE	NEW CAMS & STOP FOR AUTOMATIC SCREW MACHINE	DRILL, TAP & CUT-OFF ON AUTOMATIC SCREW MACHINE TO COMBINE OPERATIONS 1 & 3, ELIMINATE OPERATION 2 & TRANSPORT		
4	NEW	NEW DIE	DEFORM ON PRESS IN PLACE OF DRILLING & TAPPING	MODIFY TO ELIMINATE THREADS	
5	ELIMINATE	ELIMINATE	ELIMINATE	ELIMINATE FUSE PIPE REDESIGN VALVE	COMBINE WITH VALVE SEAT
	LITTLE CHANGE	NEW BENDING DIES	NO CHANGE	MODIFY	REDUCE LENGTH OF TUBING AND AMOUNT FUSE METAL

Fig. 3—Form provided for the listing of improved machining operations.

for analysis. He chose it because he felt that the machining operations could be improved. Figure 3 shows his "Possibility Guide". To fill out a complete guide, he was required to think of areas of change beyond those he

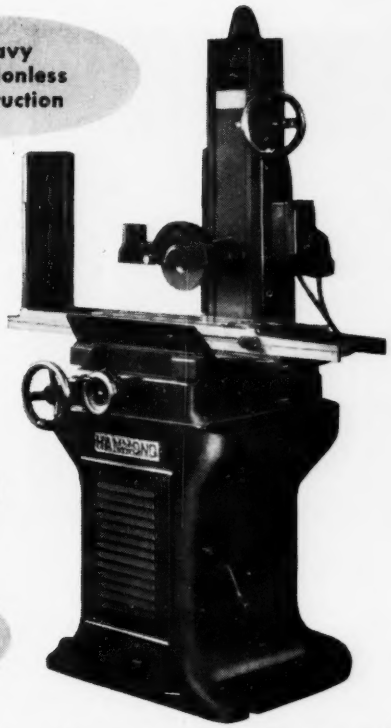
✓ Heavy Vibrationless Construction

✓ Smooth Roller Chain Table Drive for longitudinal travel

✓ Double Dovetail Spindle Carrier Ways

✓ Self Adjusting Spindle Raising Nut

✓ Vernier Attachment for Vertical Adjustment



accurate grinding for small tools

✓ One-Shot Pressure Lubrication System

• The Hammond No. 2, 6″ x 18″, Surface Grinder is a precision tool room machine for use on the most accurate gauge and tool work. The standard spindle is direct motor driven and is mounted on precision pre-loaded ball bearing. Total vertical adjustment is 10¾″. In and out movement of the table is 6½″ with a longitudinal travel of 18″.

Write or wire for further information.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio

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FOOTBURT-HAMMOND SURFACE GRINDER

a time tested line of machine tools

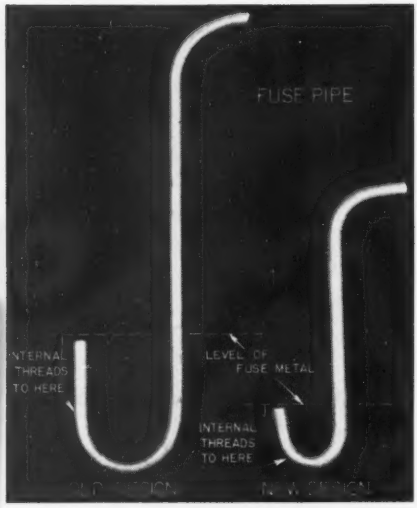


Fig. 4—Illustration showing both old and improved design of a household gas refrigerator fuse pipe.

originally contemplated. The result was a change in design shown in figure 4. The saving in tubing and expensive fuse metal is apparent. It amounted to over $9,000 a year. The machining has also been changed, but the saving from this was minor. This man is convinced that anything can be improved as long as it exists.

Much has been written and taught about the techniques which involve the use of process charts, operation charts, time charts, and simo-charts. Most people are familiar with some of these. It has been our experience that men must actually apply them to comprehend their scope and value. They are explained in our text material, discussed in group meetings, illustrated with motion pictures, and then each of them is used by every man for a practice project. The charts, which are a part of these techniques, provide a systematic means to record observations accurately; furnish a list of known data for analysis; provide an excellent way to devise a proposed method graphically; make it easy to examine the proposed method or compare it with an existing one; and often can be used as a guide to insure and simplify the correct installation of a new method.

Servel is giving Work Simplification training to men who take part in designing, planning, setting standards, etc., and to all of its supervision. These men have urged that this training be carried on until all of our employees have had some of it. Our present plans are to do so.

The opportunity is yours, if you are a member of top management, to "strike it rich" for your company and your employees by properly introducing a Work Simplification program. If you are not at the top, the odds are against your success in starting a Work Simplification program unless you can induce top management to go through it first and then to assure you of their energetic support. Work Simplification is everybody's job, but it is top management's job first. That's the way it is at Servel, and it is paying off.

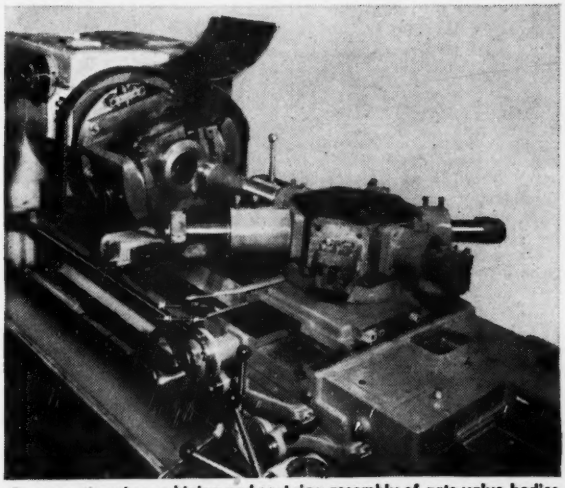
"Well . . . He's Not Bad . . . But Can He Read Blueprints?"

production pointers from GISHOLT

A UNIQUE SERVICE IN THE MACHINE TOOL INDUSTRY

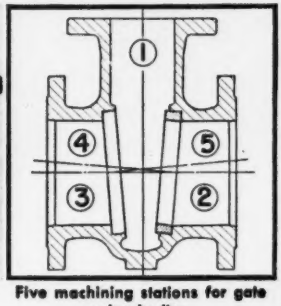
Here you obtain unbiased help on your turning problems, because Gisholt's broader range of equipment includes both types of manually operated turret lathes as well as three distinct types of automatic lathes. Gisholt's recommendations are made without prejudice for one type of machine over another. Gisholt's compelling interest is to help solve your problems in the most efficient manner.

TIME AND COST CHEATED WITH SMART "ANGLES"



Ten operations in machining and seat ring assembly of gate valve bodies are done in one chucking by this Gisholt 3L Turret Lathe.

Before and after with only 23.5 minutes in between.



Five machining stations for gate valve bodies.

SPECIAL SLIDING AND INDEXING FIXTURE PROVIDES THE COMBINATION

Here's Gisholt producing gate valves this time. In this highly competitive industry, Gisholt Saddle Type Turret Lathes are providing the cost-cutting combination of straight machining, angular machining and seat ring assembly of valve bodies in but a single chucking.

The Gisholt 3L you see here has a five-position indexing fixture which speeds production because it permits the usual turret lathe work to be done at positions 1, 2 and 3 (see below)—and then adjusts for machining at positions 4 and 5 at a 5-degree angle.

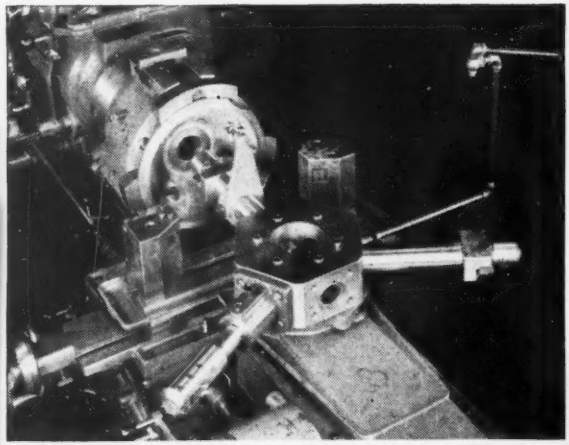
QUICK SHIFT TO ANGLE WORK

A special sliding arrangement provides not only the 5-degree work angle—but the new centerline then corresponds with the seat ring centerline. After the recess is bored, faced and threaded, the spindle is stopped. The seat ring is then started on by hand. On goes power, and the seat rings are screwed in tight with a driver mounted on the arbor. Then they are finish faced with the cross-feeding turret.

Another cost-cheating feature of the Gisholt 3L Turret Lathe is the special arrangement of the electric headstock clutches. This permits adjustable torque control so that the *specific torque* required for seating each ring size can be quickly regulated.

All operations—facing three flanges, turning two flanges, boring, threading, seating and facing both seat rings—require only 23.5 minutes for a 6-inch valve. And in *one* chucking! A case of "angles" paying off!

HOW TO MAKE A PROBLEM PART BEHAVE!



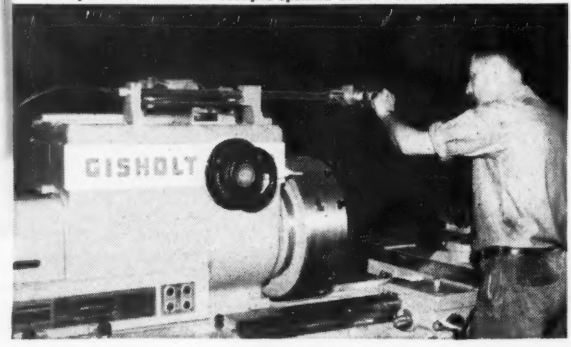
Close-up of tooling and Gisholt 3-jaw air chuck with special pot-type chucking fixture.

KEEPS EYE ON WORK WITH REMOTE SPINDLE CONTROL

The production of certain large parts, such as valvebodies, frequently requires close attention for frequent checking of hard-to-see interior surfaces. So, Gisholt Engineers devised this telescopic remote control

When mounted as on this 2L Saddle Type Turret Lathe, the operator extends the controls so that they are right in front of him. He can now closely observe his work without moving about to reach the usual controls on the headstock. This telescopic spindle control for starting, stopping and reversing is available at a very nominal cost. It may be had with any Gisholt Saddle Type Turret Lathe.

The operator extends telescopic spindle control convenient to work.



SHOWS VALUE OF FIRM GRIP IN FACING PROBLEMS

No more difficulty in securely holding parts like these irregular cast-iron housings! Now, such problem parts become models of good behavior—thanks to a special pot-type chucking fixture attached to the body of a standard Gisholt 3-Jaw Air Chuck.

The problem is solved by four adjustable supporting pins for the rear of the piece and three adjustable jacks for the flange. Routine machining of the flange and bore is handled simultaneously from the cross slide and turret. Note the dial indicator built into the turret tooling. This assures close tolerance between face of the bore and face of flange.

Problem parts such as this are a snap to hold with the special fixture.

This job is handled on a No. 4 Ram Type Turret Lathe. It is a smart and economical production setup. And the machine can be quickly converted to standard turret lathe work.

LITTLE WHEEL . . . BIG HELP!

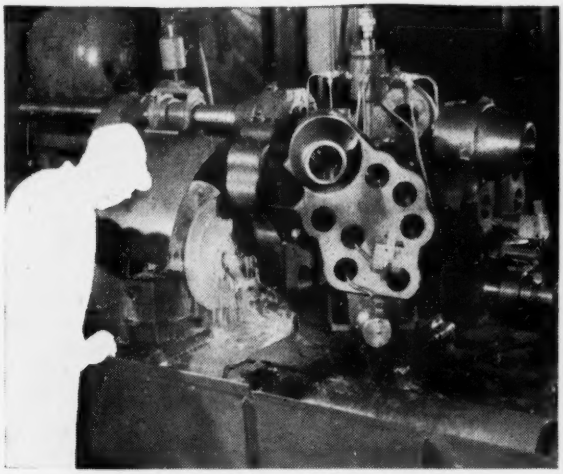
It's the Gisholt Hydraulic Speed Selector. This unit does all the shifting, hydraulically—*automatically*. To select the proper spindle speed, operator merely turns the clearly marked handwheel.

Operators like this Gisholt feature because there are no levers to move—no physical effort. Foremen like it because proper speed selection is so easy, operators work more efficiently. Available on all Gisholt Turret Lathes except six speed ram type.

A famous Gisholt feature—the Hydraulic Speed Selector.

GISHOLT

COST CUTTING IDEAS



Setup of the Fastermatic for machining inner axle carriers.

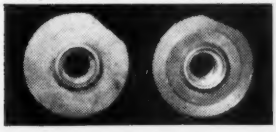
AXLE CARRIER MACHINED QUICKLY, ACCURATELY AND AUTOMATICALLY

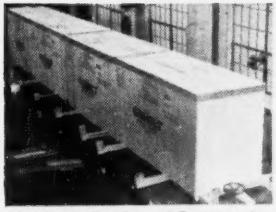
Here's another example of how the Fastermatic pays off in high-volume close-tolerance production. This Gisholt 4F Fastermatic Automatic Turret Lathe is producing inner axle carriers for heavy road equipment.

The parts are made up of two pieces, welded together. The 6.2995" bore must have a rough, semi-finish and finish cut. *And* it must be held to plus .001, minus .000". In addition to this precision boring, *thirteen* other surfaces are being turned, bored, faced, necked and chamfered. The whole operation takes only 15 minutes.

Why the operator in silhouette? He's away tending other machines while the Fastermatic is finishing this part.

Every 15 minutes one of these carriers is completed on the Fastermatic.



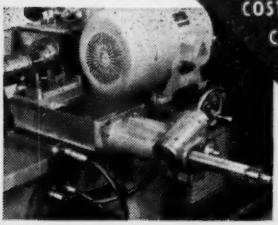


Next stop, for these 4 Fastermatics, Italy.

ITALIAN PRODUCTION GETS 4 "YANKS"

Here are four American production "geniuses" with special talents for high volume precision machining ready for trip to Italy and a large electric motor manufacturing plant. They are Gisholt 1F Fastermatic Automatic Turret Lathes—masters in their class every time!

SPECIAL SLIDE REPEATS TO .0002" ACCURACY!



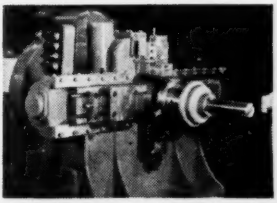
The fast way to groove pistons.

This is a special rear slide on a No. 12 Hydraulic Automatic Lathe for grooving piston rings. 12 rings are gang-mounted on an arbor and turned from the front slide. The rear slide then feeds in to simultaneously form-groove all rings. A repeat accuracy to depth of ± .0001" is maintained. This, combined with a fine adjustment of .00005" per graduation, offers exceptional accuracy for such high production work.

Because of a wide variety of piston rings, this machine is also equipped with infinitely variable speeds of from 320 to 640 R.P.M.—for the exact speed to give the best finish for each size.

SIMPLIMATIC GETS AHEAD BY CLEVER HEADWORK!

Vertical headwork, this time! The job is facing and boring the rabbet fits on electric motor frames—using the Simplimatic Automatic Lathe. The frame is arbor-supported and driven by a lug. Two horizontal slides, feeding outward from the spindle centerline, rough and finish face. Two vertical slides, feeding parallel to the spindle center-line, rough and finish bore the rabbet fit. Another vertical head (not shown) does the same operation on the other end of the motor frame.



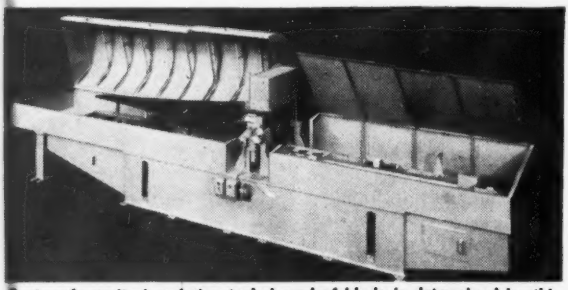
Vertical head machining of motor frames.

GISHOLT

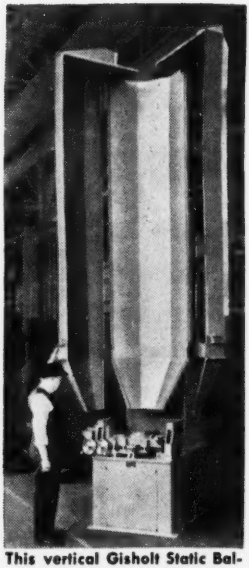
TAKING THE "JITTERS" OUT OF AIRPLANE PROPS

Vibration is destructive! It cannot be tolerated in high speed rotating members. That goes for airplane propellers, too. Turning at tremendously high speeds, imagine the vibration and punishment only a little unbalance can cause.

Here's how plane props get over their jitters! These two new Gisholt Static Balancers handle individual propeller blades. Each machine has a special job to do. The vertical balancer locates the center of gravity in relation to the leading and trailing edges of the blade. The horizontal machine determines how far the center of gravity is located from the hub end of the blade. Both machines give accurate measurement, lessen the strain of vibration on motors—to make air travel safer, more dependable.



Center of gravity in relation to hub end of blade is determined by this Gisholt Static Balancer.



This vertical Gisholt Static Balancer encloses propeller blade to exclude air currents for accurate balancing.

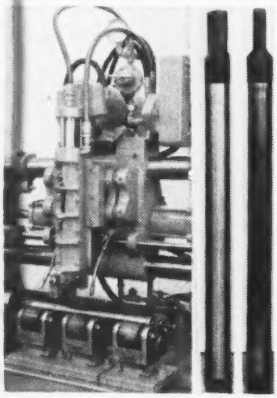
SUPERFINISH EXTENDS PACKING LIFE, TOO!

Superfinish has many uses—from increasing bearing life to cutting the cost of grinding. Here's how it solved another problem. It was packing trouble for this builder of farm tractors—caused by a rough plunger in a hydraulic pump that operated attachments.

The hydraulic ram plunger was ground to 10 micro-inches—needed finer finishing to overcome packing wear. Only Superfinish could offer the required degree of smoothness and geometrical accuracy at the required production rate—and at an economical machine cost.

A Gisholt Model 51A Superfinisher went on the job. Now the parts are rough ground to 20-30 micro-inches. This saves a very small amount of grinding time, but the wheel dressing time is considerably reduced. Then the parts are Superfinished for 45 seconds producing an 8-10 micro-inch finish.

If you are interested in Surface Quality Control, you will want to know more about Superfinishing. Write for your free copy of the textbook "Wear and Surface Finish." Please use your business letterhead.



Before and after Superfinishing of plunger, and the machine that does the job.

VACUUM SWEEPER MOTORS LAST LONGER . . . THANKS TO BALANCING

You might not think balancing has a place in the little motor in vacuum sweepers. Yet, it is vital—as this glimpse into one of America's largest manufacturers shows. Here, the entire production of the tiny armatures is balanced on Gisholt machines at a rate of 125 per hour. Balancing means a better product, longer life, fewer service troubles. Perhaps this careful attention to quality is one reason why this manufacturer is one of the foremost in the industry.

Balancing electric motor armatures.

THE GISHOLT ROUND TABLE **represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.**

DYNETRIC BALANCERS GISHOLT

No. 450

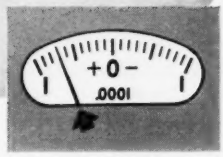
GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

Literature on Gisholt Turret Lathes, Automatic Lathes, Superfinishers, Balancers or Special Machines is available upon request.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Find out for yourself....



why people who try it buy it!

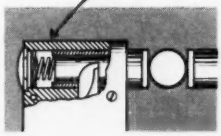
You've used regular "mikes" for such a long time you'll be amazed at the downright accuracy and plain honest-to-goodness convenience you can get with this CONSTANT PRESSURE, INDICATING MICROMETER. Just try it and you'll know why so many are buying it!

You'll discover the Federal MIKEMASTER has more worthwhile advantages than any other micrometer. It's the first really new micrometer made in this country in years. Once you've used it you'll recognize its superior accuracy — and you'll appreciate the convenience of reading an indicator instead of barrel graduations. You'll see how easy it is to check out-of-round and taper, too. You'll find its "repeat" accuracy matches some of your laboratory gages even though it sells for so much less money.

You'll also be pleased with the usefulness of the pushbutton Retracting Anvil and the Tolerance Hands when measuring duplicate parts. You'll find extra value in the *lapped*, Tungsten Carbide Anvils — and you'll just naturally like its nice balance and its *rust-proof*, dull chrome finish.

You don't have to take our word for it. Find out for yourself. Ask to see the Federal MIKEMASTER . . . and to try it on your work. Write to Federal Products Corporation, 1144 Eddy Street, Providence 1, R. I.

You'll appreciate the convenience of reading the Indicator instead of barrel graduations. The constant pressure of the anvil means constant measuring pressure every time.



FEDERAL

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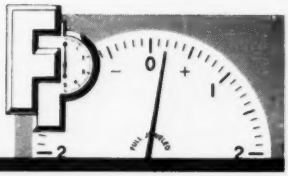


C. W. Hinman

Analyzing Blank and Scrap Strip Developments

Overcoming the problem of perforating a blank with closely spaced holes and computing a progressive die blank

By C. W. HINMAN
Designing Engineer

OCCASIONALLY, it is necessary to design a die in which the blank contains a group of closely spaced holes as shown in Fig. 1. The holes are too near one another to be perforated and the blank to be cut in a two-step die, and because of the expense it is not thought advisable to design a compound die in which the blank and all the holes might be cut at one station.

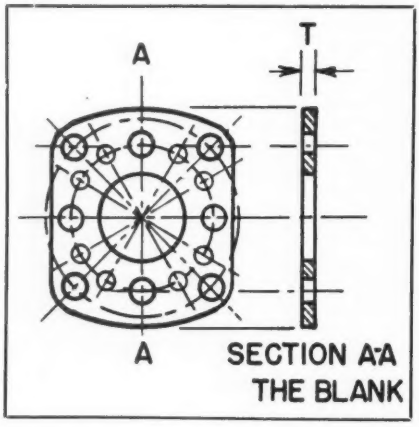


Fig. 1—Drawing of die for producing blanks which contain a group of closely spaced holes.

The best design in such a case is a multiple station progressive die in which the holes may be spotted in groups and thereby perforated at several stations. This has been done in the scrap strip layout Fig. 2, where all the die openings are section lined to cause them to stand out clearly.

At Station 1, the large center hole and four corner holes are perforated. All the round holes are "bushed" with hardened, ground, and lapped steel bushings. Such bushings have two advantages; (1) It is possible to regrind the bushing holes to correct size and locations if the die block becomes distorted in hardening. Frequently the bushing holes are not round, or of slight elliptical shapes after heat treatment. (2) Bushings can be subsequently exchanged for others of a different hole size or shape, which is often necessary after the die has been put into production.

The entering end of the work strip is halted over Station 1, when the oper-

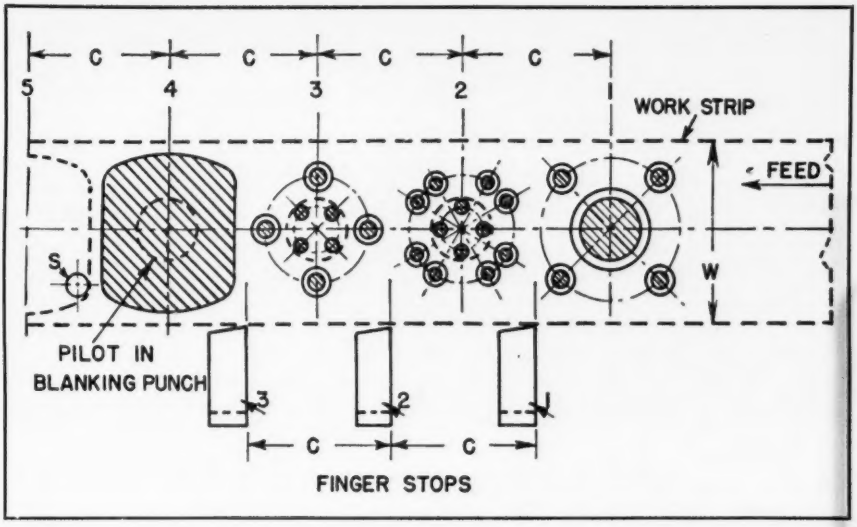


Fig. 2—Scrap strip layout in which holes are spotted in groups to be perforated at several stations.

ator depresses finger stop number 1, shown in Fig. 2. The use of finger stops prevents fractional cuts and possible injury to cutting edges, and also prevents wasting the first blanks.

At Station 2, after the second finger stop is depressed and the work strip fed against it, eight small holes are perforated on the inner circle of the blank. The four holes located at the center of this die station are aligning holes into which four bullet-nosed pilot pins enter before the punches descend to pierce eight holes in the blank. These four pilot pins register within the periphery of the large center hole which was cut at Station 1. Notice that each of the four pilot holes are positioned at maximum distances from the eight bushing holes. It would not be good designing to specify a full one-piece pilot hole here, because the edge of its clearance hole, in the die block, would be too close to the eight bushed holes.

At Station 3, after depressing the third finger stop and feeding the strip ahead, the last four holes are perforated in the work strip. Here too, the four pilot holes located at the center of this station are spaced as far as possible from the bushing holes. The forward end of the work strip is then fed against finger stop **S**, and the blank is cut at Station 4. The blanking punch is provided with a full one-piece pilot pin, as indicated by the dotted circle in the die opening.

This is a hand feed and pin stop die. The workpiece is tilted up in front by the operator, and in feeding ahead, the right edge of the last blanked opening registers against stop pin **S**; the strip can then be fed ahead at high speed. The strip is fed through a clearance channel in a positively attached stripper plate, which is unnecessary to show in a scrap strip development.

At Station 5, a cutting punch severs the scrap strip on the left edge of the blanking die block. Cutting blank lengths to blanking centers **C** avoids the difficult handling of long scrap strips, which is one of the problems

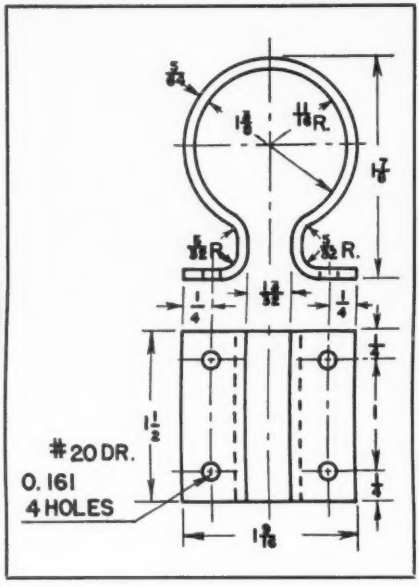


Fig. 3—Drawing of a steel bracket to be produced progressively at high speed.

in a pressroom. The cut scrap slides off into a container which is located at the left side of the press.

The press is operated at a speed of 80 strokes per minute, and a good operator should be able to "catch" one-half of them. This speed would provide for a gross production of 2,400 blanks per hour, and less the usual 20 per cent, a net output of approximately 1,900 blanks hourly. However, by using coiled strip in recent models of high-speed presses, such as "Lempco Hypermatic" or the "Ferracute Superspeed press," gross outputs can be increased up to three or four times the figure quoted for hand feeding.

Computing a Progressive Die Blank

Figure 3 shows a drawing of a steel bracket to be produced progressively at high speed. The layouts for this bracket are sketched in Figs. 4, 5, and 6. The work material is rather heavy being No. 14 U. S. Gauge 0.0781 in. strip steel. Most tool engineers would compute the required length of this blank mathematically, but the "old timer" might measure its length with thin, narrow metal strips. He would clamp a metal strip around the outside of the bracket, and another around its inside. By marking the length of each strip, he would then add them together and divide by 2. In this way he might ascertain the correct length on the medial neutral bending line, if he did his work carefully. However, he could not do that unless he had a formed sample of the bracket, and by the time he made one and measured it, an experienced tool engineer could figure the correct blank length in one-half the time. The apparatus designing office seldom furnishes a formed work-sample, and if they do it is usually of approximate size, and quite useless for determining the correct length of blank.

Figure 3 represents the usual print dimensions of the bracket as received in the tool designing office. The tool engineer makes another layout of the work on a line coinciding with the cen-

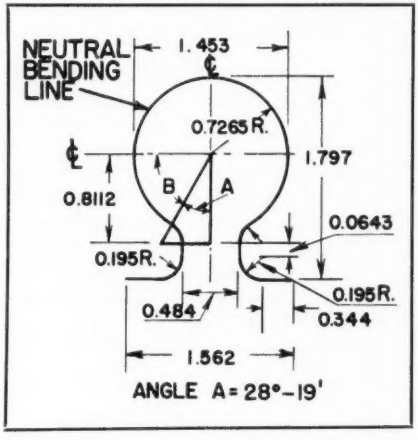
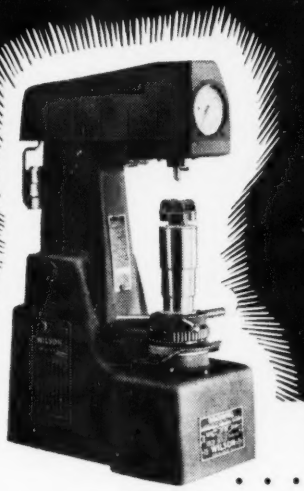


Fig. 4—Initial layout of steel bracket shown in Fig. 3.



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. . . with many uses, but only one standard of precision

• For research, supervision or control—in laboratory, toolroom or production line—tests made by the "ROCKWELL" Superficial are as representative of hardness as those made on the regular "ROCKWELL" Hardness Tester. Only requirement is that, since depth of indentation is only .005″ or less, surfaces must be smooth and materials homogeneous for general testing.

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ter thickness of the piece, as shown in Fig. 4. This is the correct procedure if the radii are all equal to or greater than twice the material thickness.

The first determination is for the length of the large semicircle above the horizontal centerline. This length is obviously $1.453 \times (3.1416/2)$, and is written at one side for the beginning of a column used for obtaining the total.

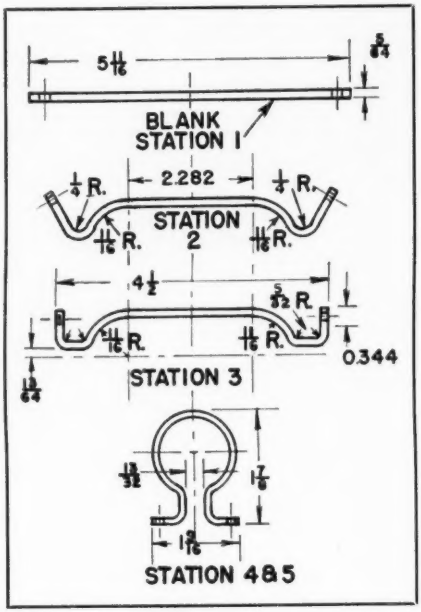

Fig. 6—Sketch showing proposed operations represented in scrap strip layout Fig. 5.

Next, draw triangle **A**, in which its hypotenuse and short leg are known from the other dimenions given. The sine of angle **A** is the length of the short leg divided by the length of the hypotenuse, and by consulting a table of natural trigonometric functions of right-angled triangles, this angle is found to be 28 deg. and 19 min. Therefore its complementary angle **B** is 61 deg. and 41 min.

Using the table as given in Vega, a book of seven place logarithms, giving

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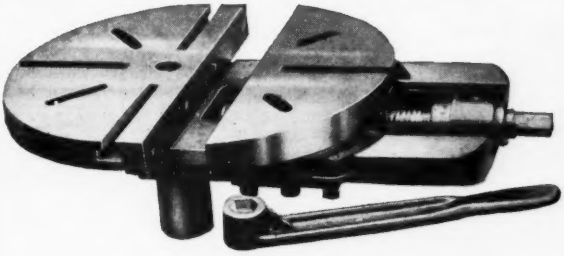

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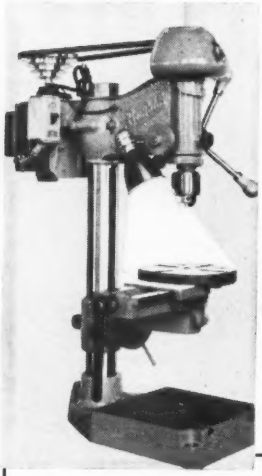

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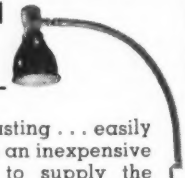

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the lengths of arcs in circles whose radius is 1 or unity, we now have all the necessary data to find the lengths of the two large arcs directly below the horizontal centerline, and this is also written in the column. Using the same process to determine the lengths of the four small arcs, their total lengths are also written in the column.

The length of the long leg in triangle **A** is cosine **A** $\times$ the length of the hypotenuse or, 0.88034 $\times$ (0.7265 + 0.195) which is 0.8112 in. The difference between 1.797, the overall height of the figure, and the sum of 0.7265 + 0.8112 + 0.195, is 0.0643 in., and twice 0.0643, or 0.1286 in. is placed in the column, because there are two of these lengths. The two lengths, 0.344 in., which are the straight parts in the base having a total length of 0.6880 in., are placed in the column. The column is now completed and should appear as follows:

	Inches
Length of large arc above horizontal centerline	2.2823
Lengths of two large arcs below horizontal centerline	1.5642
Lengths of four small arcs	1.0326
0.0643 in. times 2	0.1286
Length of two base lines	0.6880
Total, or the developed length of blank	5.6957

The nearest common fraction is 5-11/16 inches.

Operation of the Die

Figure 6 illustrates the proposed perforating, blanking, and forming operations to be performed at each of the five die stations represented in the scrap strip layout sketched in Fig. 5. With the work strip pushed against a finger stop, the first operation is slotting and perforating four holes. Slotting is necessary here because if we merely sheared a cut between the blanks in this comparatively heavy sheet steel, the cuts would not have

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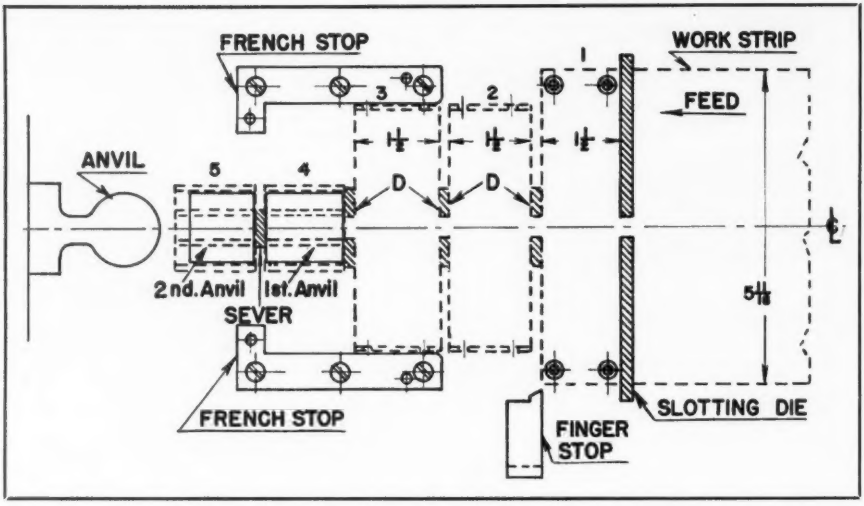

Fig. 5—Illustration showing the proposed perforating, blanking, and forming scrap strip layout for steel bracket shown in Fig. 6.

a definite ending at their inner terminations, and the final cut-off would show objectional notches instead of smoothly joined cuts. Shearing also distorts the strip and work, and does not provide a definite space between the blanks for subsequent forming and cutting-off operations. These conditions are well known among experienced tool engineers and practical die men. However, there are cases in which a work strip of thin gauge material, where the cut is not as long as in Fig. 5, and slitting then becomes good practice.

The die is covered with a positively attached channel stripper plate extending to the second station, but is omitted in Fig. 5 for clarity. At **D** elongated holes are entered by six pilot punches attached to the punch holder, thus keeping the work in constant alignment. A spring-pad which is between the forming punches covers Stations 2 and 3. The work is halted and positioned in Station 4 by a pair of French stops, and after forming at that station, the work is pulled inward, thus freeing the work strip for feed-

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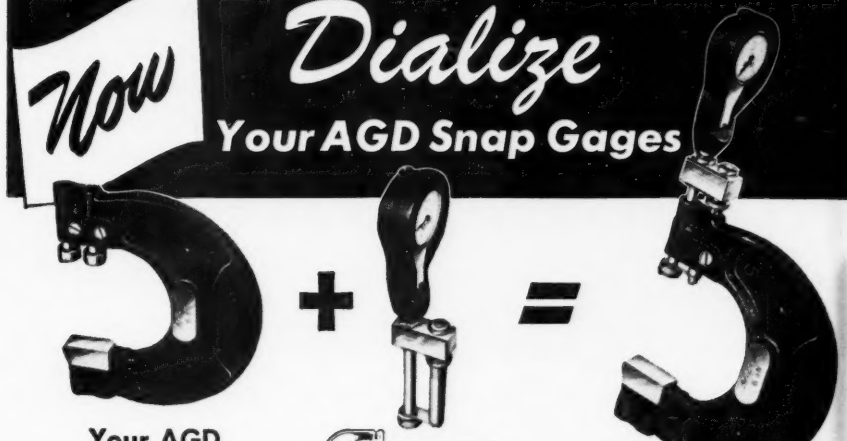

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ing ahead. French stops are sure, positive, and of convenient design, and are frequently employed in designing all types of progressive dies, if conditions permit. The spaces between all the forming punches are provided with spring pads (or two spring pins at Station 4). The pads, in descent, contact the work ahead of forming, hold the blank in position, and in ascent, eject the work from the punches without lifting it from the die. That is one of the convenient features when using spring-pad ejectors, and is an important operating function to keep in mind.

At Station 4, the third operation is advanced over the die in order to contact with the French stops. The work is also guided at its ends by side blocks while being advanced. Here, the final forming operation is completed on two anvils that have the same outside contours as around the inside of the finished piece.

The die maker has made proper allowances for "spring-back" in the work, which will occur at all forming stations. This allowance must be made in the shapes of both the punch and die members. The amount of spring-back is determined by experiment, so that the completed workpiece from the die will coincide approximately to the specified finished dimensions.

Final forming is produced by the descent of a straddle punch in which two spring-pins contact the work ahead of the punch on the first anvil, and holds down the work positively while forming down its ends. Near the completion of the down stroke, a cutting-off blade or punch severs the small connection or neck of metal that joins the blanks. Severing is done between the two anvils. At the next advance of the work strip the severed piece ahead is pushed from the second anvil—finished.

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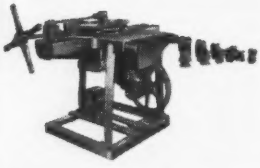

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A single hydraulic system is employed for operating the hydraulic tracer valve and the piston which controls the movement of the tool slide carrying the cutting tool. This simplicity is an outstanding feature and insures accurate reproduction, freedom from failures and elimination of work rejects. This new metal cutting technique permits continuous cutting without interruption for measuring or calipering at feeds and speeds to the cutting limit of Cemented Carbide tools. "Miking" on shaft work is confined to the first diameter only after which all other diameters are secured automatically.

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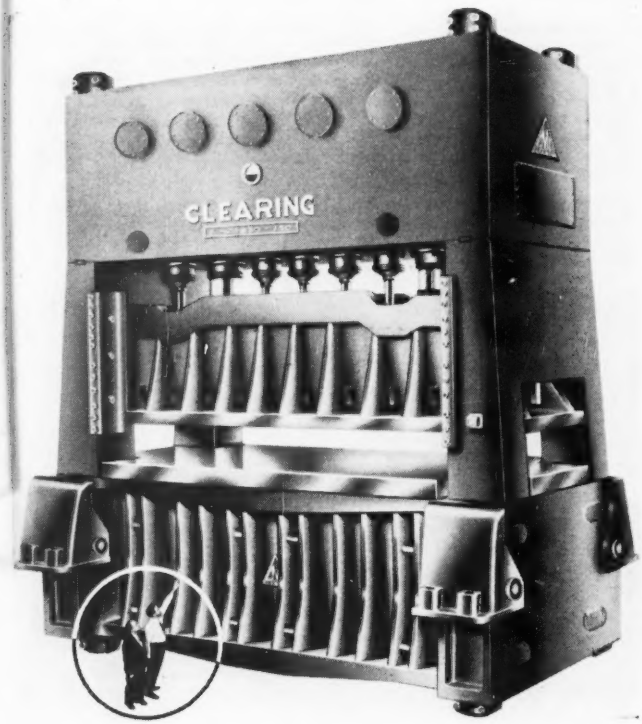
Using light-gauge, soft non-ferrous sheet, the shape of the bracket shown in Fig. 3 can be produced in dies of several other types and designs. For example: The work can be formed with the loop up. Again, after being slotted and perforated at Station 1, the loop can be formed down U-shaped, then passed along on an anvil to a third station where side cam punches converge horizontal forming blocks (one on each side) that finish the bracket and "set" the work to compensate for spring back. This die would eliminate Stations 2 and 3 in Fig. 5, which are necessary only because of the heavy gauge of strip steel used.

Our next article in MODERN MACHINE SHOP will begin the subject of bending and forming dies, introducing sketches, computations, and recent photographs of late model presses that produce formed parts for interchangeable manufacturing.

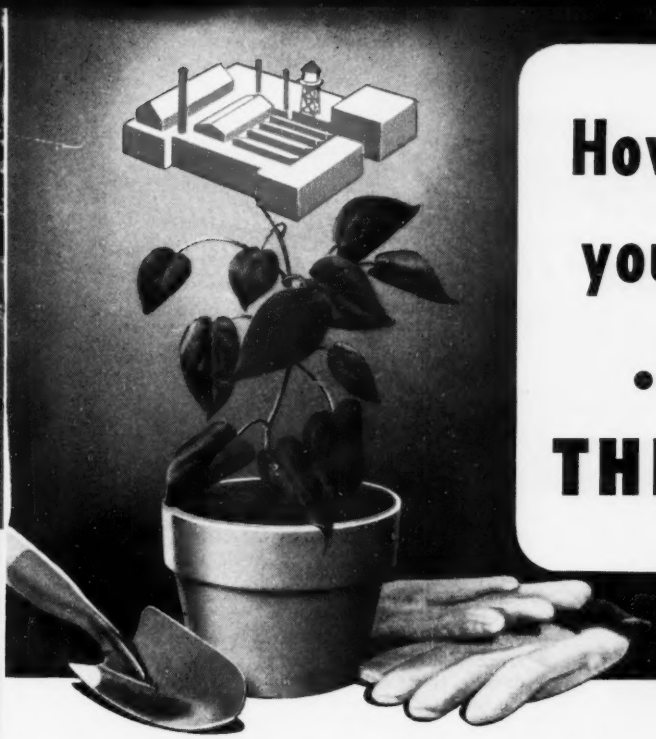
N. M. T. B. A. Spring Meeting

The Spring Meeting of the National Machine Tool Builders' Association will be held in Chicago, Illinois, at the Edgewater Beach Hotel on Wednesday, Thursday and Friday, May 3rd, 4th and 5th. The board of directors will meet on Wednesday, the 3rd. The general sessions of the association meeting will take place on the 4th and 5th.

Mammoth Forming Press



AN artist's conception of giant 3,850 ton Clearing press showing the relative size to the men standing in front. A drawing was necessary to show the completed press which was manufactured in sections and will not be erected until it reaches its destination in France. Each major part of this tremendous press is a single piece of metal. The bed is 440 ft. long and weighs 175 tons. The bed is designed to receive dies which are 84 inches by 350 inches in size. The press will be used to form channels and rails from ½ inch thick plate stock in lengths up to maximum capacity of the press.



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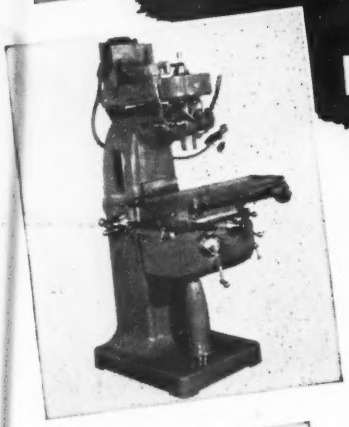

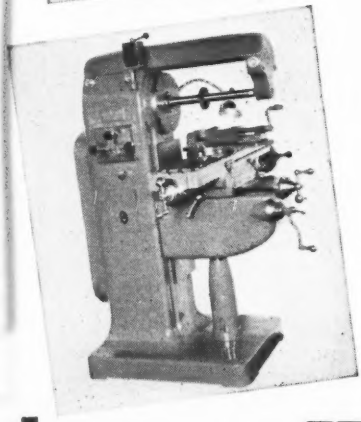

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Notes on Standard Elemental Data

By PHIL CARROLL, JR.

THOSE who are earnestly trying to do a good job in timestudy work would like to have all of the operations which are set up on an incentive basis established at an economical cost. The usual approach, however, is through the use of direct timestudy, for reasons I do not know. I would call that method "ratesetting"—one study, one "rate". The method of direct timestudy is expensive; and, more important, the results are not consistent; the procedure will never work satisfactorily in a job shop because the work will usually be finished before a standard can be set. Indirect labor operations in most plants are not on an incentive basis because it is impractical to timestudy every job.

As timestudy men, we seek to eliminate waste motion. Why then do we persist in doing our own work over and over again. Why do we timestudy the same elements year after year in operations such as coremaking, casting cleaning, drilling, turning, painting, and assembling? Why do we not take our timestudies in such detail that they will yield Standard Elemental Data?

Standard Data is not new; Taylor set up the basis for it more than 60 years ago. What he said was as follows: (a) "Describe, record, and index each elementary movement, with its proper time, so that it can be quickly found" and (b) "Add together into various groups such combinations of elementary movements as are frequently used in the same sequence in the trade, and record and index these groups so that they can be readily found."[1]

Taylor's thinking was unusually keen when we consider that he did not know all that we know today about the merits of continuous and snapback watch reading, model selection and rating, 100 per cent base, and 60 Unit Hour.

In the writer's opinion, Standard Data is the best method we have today for getting maximum incentive coverage by timestudy measurement. The reader should remember that this opinion is prejudiced by long and almost exclusive experience in job shops. Standard Data has many advantages which include the following: (a) Operation standards set from it are consistent; (b) Standards can be set before the work starts; (c) Standards are much less expensive; and (d) Standards coverage can be much more extensive.

Standard Data refers to all of the element standards, curves, tables, and charts that are compiled to measure a type of work. The term, Standard Elemental Data, means the basic results from the timestudies, summarized, in definite times for the constants, and in curves or tables for the variables. These results might be called Basic Data. The elemental standards

1. *Frederick W. Taylor by Copley—Harpers, Vol. I, p. 227.*

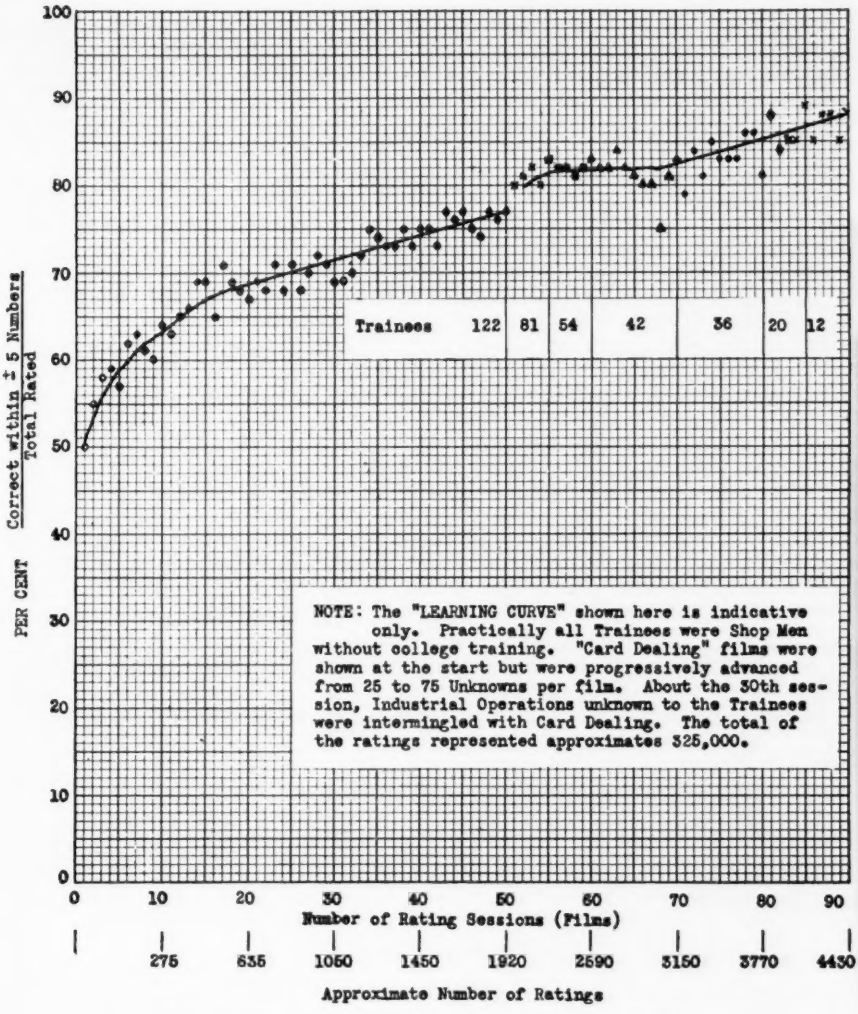
PER CENT Correct within ± 5 Numbers / Total Rated
100
90
80
70
60
50
40
30
20
10
0
Trainees 122 81 54 42 36 20 12
NOTE: The "LEARNING CURVE" shown here is indicative only. Practically all Trainees were Shop Men without college training. "Card Dealing" films were shown at the start but were progressively advanced from 25 to 75 Unknowns per film. About the 30th session, Industrial Operations unknown to the Trainees were intermingled with Card Dealing. The total of the ratings represented approximates 325,000.
0 10 20 30 40 50 60 70 80 90
Number of Rating Sessions (Films)
275 635 1050 1450 1920 2590 3150 3770 4430
Approximate Number of Ratings

Fig. 1—Chart showing experience with Training in Rating.

are grouped and arranged in convenient form for everyday use, and this is called Working Data.

The method of data preparation presents certain factors which are well worth mentioning. Many studies are taken. The number must be sufficient to cover the range of work. The large number tends to eliminate the problems of selecting the best operator, getting the foreman's O. K., and tuning up the operation. A large number of studies tends to produce data which represents a fair measure of the normal qualified employee. A large number of studies tends to develop a

combination of improvements in method which may be instituted when time permits and when quantity justifies. The time involved in taking many studies permits an explanation to be made to supervisory and general employees concerning the reason for the timestudy work so that, before the standards are ready, an attitude of understanding may be developed.

This last mentioned point is very important—so much so that I give it as the reason why I think data must be compiled within an organization. Said the other way around, I do not believe in having one company buy or borrow Standard Data from another organization. The actual cost of the timestudy may be reduced, but my guess is that more than the equivalent amount of time and, therefore, money would be spent in trying to prove that the outside data actually fit the conditions of the company. We must remember that "our business is different". The men in the shop feel that way just as strongly as do the President and the Works Manager.

Hence, the all important problem of installing standards is solved by means of a method which we commonly call **Selling.** In my opinion, this selling is accomplished more easily through the use of Standard Data than by the use of direct timestudy. Direct timestudy "ratesetting" makes an individual selling job of each individual standard; more especially, each standard usually involves the individual personalities of the timestudy man and the employee affected. Standard Data reduces the resistance to the installation because: (a) Data is summarized from many studies; (b) Data is recorded in a form that makes it impersonal; (c) Element standards are the same for everybody; and (d) Each standard "sold" constitutes a partial sale of all other standards which may be set from the data.

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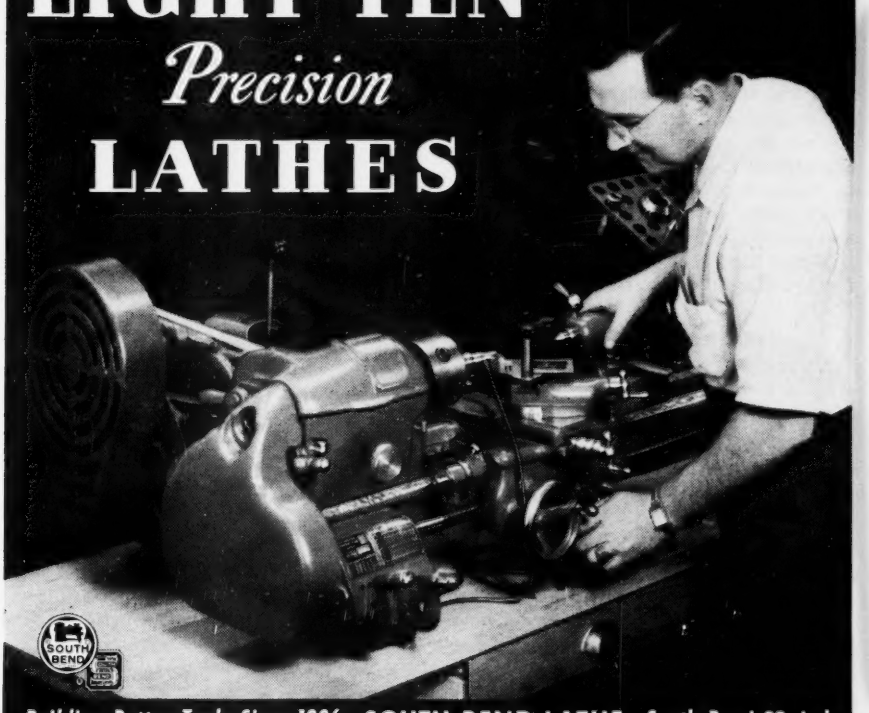

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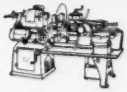
☐ TIME PAYMENT PLAN

☐ 9" and 10" BENCH LATHES

☐ 10" to 16-24" FLOOR LATHES


☐ 1/2" and 1" Collet TURRET LATHES

☐ 14" DRILL PRESSES

☐ 7" BENCH SHAPERS

Name _____ Company _____

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The Timestudy Man

Despite the advantages of Standard Data, it is my belief that 75 per cent of timestudy work is Human Engineering as distinguished from Technical Knowledge. This means that the type of man who is selected for the work must have a pleasing personality. The next characteristic in importance which the man must possess is strict mental honesty; integrity and reliability are very necessary, especially in successful work with unions. A third characteristic which is necessary for some jobs is the aptitude for sound analysis of cause and effect.

Trade skill has always seemed to me to be an essential ingredient in a Standards Department which sets out to measure jobbing and non-repetitive work such as maintenance and other so-called indirect production jobs.

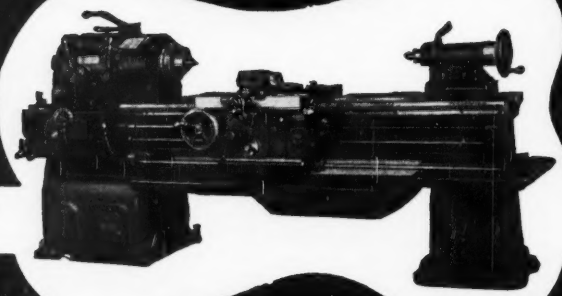
When timestudy men are selected for training from within an organization, promotional outlets and other advantages accrue. The chief advantage is that it is easier to teach timestudy to one who knows the products and policies of a company than vice versa.

Training

Training men for standard data preparation is unusual in several particulars. Only two important ones will be emphasized here. First, however, as a matter of information, most of the training I would give would be presented to insure a thorough understanding of philosophy—the principles and reasons "why". In exaggeration, I say that the trainee should be handed a stop-watch just as he is about to graduate. The reason is that he seems to close his mind to further learning once he acquires his "badge of office."

Two phases of training, important in all timestudy work, are definitely required for Standard Data timestudy.

THE SAME DEPENDABLE
BOYE & EMMES
16" LATHE
but



LOOK AT THE NEW FEATURES

Boyé & Emmes have always built into their lathes simplicity, power and rigidity, ease of operation, accuracy and long life. Our present model furnishes higher spindle speeds and a greater number of thread, lead and feed changes, among many other improvements. *Write for bulletin.*

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HEAVY DUTY LATHES SINCE 1895
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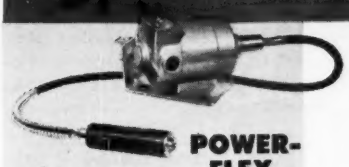
STANDARDIZE on DUMORE High-Speed FLEXIBLE-SHAFT TOOLS



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UNI-FLEX

DUO-FLEX

HOBBY-FLEX

A size and price to fit your needs!

Now you can pick the exact tool to fit your requirements, *price*-wise or *performance*-wise from the world's largest line of high-speed flexible-shaft tools. When you standardize on Dumores you're sure of getting the right tool for the job . . . at a price that's right . . . plus all the stamina and precision that have made Dumore flex-shafts favorites with shopmen everywhere. Write today for complete information.

POWER-FLEX ¼ HP, 20,000 RPM. For full-shift production. Handles all ¼" and ⅛" accessories . . . carbide cutters.

UNI-FLEX 1/15 HP, 15,000 RPM. For production and tool room work with all ⅛" shank accessories.

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$79.50–$19.75

Prices slightly higher west of Rockies.

DF—3

The DUMORE COMPANY

Dept. D-33 Racine, Wisconsin

Export Address: 13 East 40th Street, New York 16, N. Y., U. S. A.

These are training in correct element breakdown and in correct rating. Proper element breakdown should be given more stress since a correct individual "rate" may be set from improperly detailed elements provided the rating is correct, but sound Standard Elemental Data cannot be made up except from studies consisting of elements which are the same. Comparable elements are obtained when: (a) The watch is read at the same points in the cycle; (b) The elements contain the same amount of work; and (c) The ratings are based on the same Normal.

More will be said about element breakdown; let us here discuss rating as a vital phase of the training which affects anything done in timestudy but one which has no point in sequence. Training in rating is much more important than most of us know. It is probably the largest variable in the technical part of timestudy. How much training should be given is a question which I cannot answer.

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None Finer at Any Price
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FEDERAL
PRESS CO
• Finest Construction • Timken Fly wheel Bearings • Precision-built Oversize Crankshaft • Symmetrical Ram • Safety Stop • Non Repeat Clutch • Open Back – Inclinable • Easily Adjusted to Any Position.
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Federal Press Co.
584 Division St., Elkhart, Ind.
Write for new Catalog!
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FEDERAL PRESSES
25 YEARS OF QUALITY CONSTRUCTION

By way of seeking an answer, the results of some investigations were plotted for the reader's guidance. These results are shown on the "Learning Curve", Fig. 1. The reader's attention is directed to several modifying factors: (a) Most of the trainees were men without college training; (b) Most of the training was done with films; (c) Most of the films include the range from 30 U/H (50 per cent) to 120 U/H (200 per cent); and (d) All of the scores were based on a rough indicator of plus and minus five numbers.

As may be seen, as the number of sessions was increased, the accuracy of the

WHATEVER YOU FASTEN . . .

COMPOSITION TO COMPOSITION

FABRIC TO FABRIC

WOOD TO WOOD

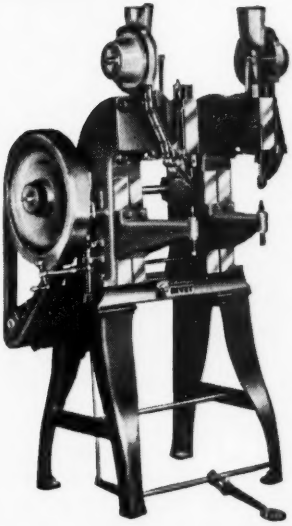
METAL TO METAL

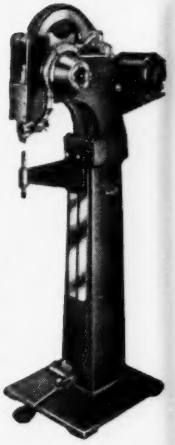
OR ANY COMBINATION OF THESE MATERIALS . . .

LEATHER TO LEATHER

Chicago AUTOMATIC RIVETING

FASTENS IT RIGHT . . . AND FASTENS IT FAST





In Chicago Automatic Rivet Setters from 1 to 4 tubular or split rivets are fed, inserted and clinched in a fraction of a second with each operating pedal release. Adjustment on some models permits handling different sizes of rivets. Riveting machine also adaptable for eyelets, grommets or drive screws.

FREE Fastening Analysis

Your output may be increased and cost reduced if you investigate. Send sample assembly and blue print.

Chicago Rivet

CHICAGO RIVET & MACHINE CO.

9621 W. Jackson Blvd., Bellwood, Ill. (CHICAGO SUBURB)

TUBULAR AND SPLIT RIVETS IN ALL RIVET METALS

Table I—Drill Presses
Master List of Elements

PICKUP PIECE
Begins: When operator starts to reach for piece of work.
Includes: Pick up and transporting of piece.
Ends: When piece is in position to be placed in jig or fixture.

PIECE ASIDE
Begins: When man starts taking piece out or away from jig or fixture.
Includes: Lift or take out, transport and laying aside of piece.
Ends: After work is placed on table, in box, or can, etc., and operator is in a free position to do other work.

LOAD IN JIG
Begins: When operator starts to insert piece in jig or fixture.
Includes: Placing and locating of piece in jig or fixture.
Ends: When work is placed correctly in jig or fixture.

LOOSEN PIECE
Begins: When man starts reaching for piece in jig or other holding or locating device.
Includes: All work necessary to loosen piece from studs, pins or other locating devices.
Ends: When piece can be easily removed from jig or holding device.

CLOSE AND LATCH LID OR GATE
Begins: When man starts to reach for lid or gate of jig.
Includes: Closing and latching of lid or gate.
Ends: When lid is securely locked or latched in place and man is free to perform other work.

UNLATCH AND OPEN LID OR GATE
Begins: When man reaches for latch or locking devices for gate or lid of jig.
Includes: Turning, unlocking or unlatching devices to permit opening of lid or gate and opening or swinging out of lid or gate to permit access to piece.
Ends: When lid or gate is open and man is able to remove piece from jig.

SCREW DOWN NUT OR SCREW OUT NUT
Begins: When man starts turning nut by hand, in or out.
Includes: Screwing in or out of nut on screw or threading stud.
Ends: When nut either hits piece or jig to prevent further turning or when man is able to remove nut from stud.

ratings also increased. The plotting of this curve revealed to me that the tentative program of 50 sessions which had been used appeared to be insufficient. Actually, 50 sessions average only 2000 practice ratings.

Variables

We have a lot yet to learn about rating. Among other things, we need to know what aptitude qualifies a man to learn rating. Thus far, I have no clue. We do know that rating is a major variable; and, for that reason, my attempts have been to minimize this variable by intensive training in rating. Trainees are shown two films every day throughout their training course.

Element Breakdown

Assuming that the variable of rating is brought within acceptable limits by the time a trainee is ready to make studies, his results may be plotted if the element breakdowns are correct. The next step is to define the element. Definition is only a part of the procedure, but it is a necessary beginning. Definition is necessary for at least three reasons: (a) Element descriptions on the timestudy are but sketchy shorthand—incomplete; (b) Several men (I prefer more than three) will take the studies that go to make up the data; and (c) Definitions are necessary to specify exactly the work included in the standard setup for the element.

An example of one page of element descriptions is shown in Table I.

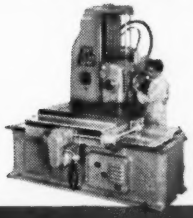
Two details which may be helpful may be mentioned here: (a) Work done not included in the element must be recorded as separate details on the timestudy; and (b) Variations within

THE "JIGMIL TECHNIQUE"

OBSOLETES JIGS

for Precision Boring Operations on Small Lot Production

TYPICAL JOB TAKEN FROM OUR JIGMIL CASE HISTORY FILE



PART • Cast-Iron Gearbox.
OPERATION • Bore and Counterbore 13 Holes Ranging from 1.8505" to 2.8335". Face Two 3½" Diameter Bosses.

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TOLERANCE ON HOLE SPACING • .0005".
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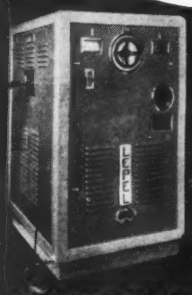
the element can often be measured by counting.

For example, Pick Up Handful—count the number subsequently applied. Some people would discontinue the study of work which did not follow a prescribed pattern; others insist upon pretraining the operators to follow a given sequence. My preference is to study work as it is being done since the irregularities are sure to reoccur and since their time standards will be necessary in order to maintain adequate incentive coverage.

Secondly, it seems necessary to get all of the timestudy facts before an economically sound, so-called "best method" can be arranged. More particularly, changing the methods prior to timestudy makes the employee temporarily unskilled. Two other suggestions which may be helpful are: (a) Take several all day studies at the start of an installation to get the whole picture; and (b) Time the job set-ups along with the operation cycles to get the "Job Change" and the standards for set-up.

LEPEL presents 2 New UNITS FOR HIGH-FREQUENCY HEATING



NEW SPARK-GAP UNIT

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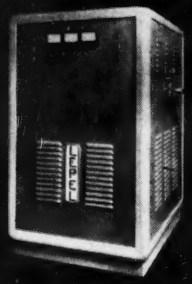
Unit can be used for heating or melting without matching transformers or condensers. Delivers full rated output when treating ferrous or non-ferrous materials. Minimum power and water consumption.

NEW VACUUM-TUBE UNIT

The last word in high frequency heating equipment of the electronic tube type, incorporating the latest improvements in its all-steel housing.

Effectively heats ferrous or non-ferrous metals for hardening, soldering, brazing, or melting applications. Easily adjusted to any load . . . does not require matching transformers or condensers. Minimum power and water consumption. Units conservatively rated at 5, 10, 20, and 40 KW output.



HARDEN

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HIGH FREQUENCY HEATING UNITS

BRAZE

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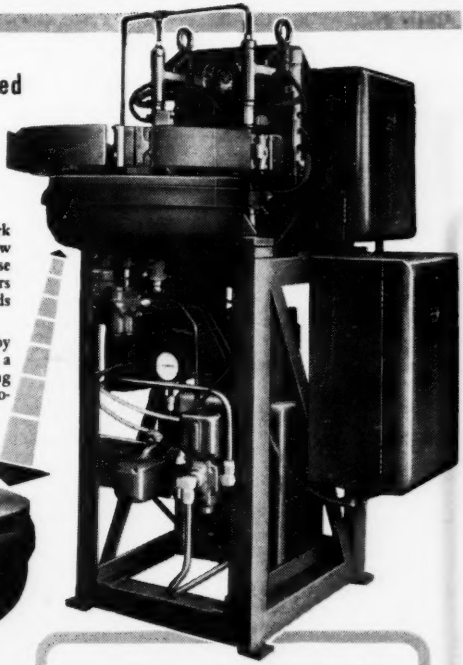
LEPEL HIGH FREQUENCY LABORATORIES, Inc., 39 West 60th Street, New York 23, N. Y.

Comparison Sheet

It has been mentioned previously that three or more time-study men are required to take studies for Standard Data. The number varies with the complexity of the task, but three is the minimum number which seems to provide good results. The group should be directed by one whom we may call the Analyst. He should take the first studies to plan the approach; he determines the final wording of the element descriptions; he sets up the master list of elements for the Comparison Sheet.

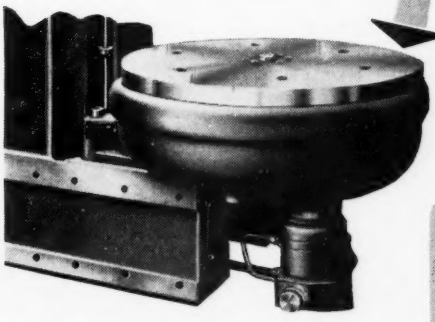
New Answer to Faster Production

Index Table Now Offers Accurate Feed For Many Types of Equipment and Many Different Operations



You get fast, automatic accuracy when you feed work to machines on Denison Indexing Tables. And now this advanced type of automatic feed is offered for use on *all types of production equipment*—backed by years of successful and often sensational results on hundreds of Denison Presses.

A good example is the welding unit at right, built by Progressive Welder Co., of Detroit. Equipped with a Denison Indexing Table, it features automatic feeding of parts to the welding guns, automatic squeeze, auto-



matic welding, automatic hold, and automatic release—in positive sequence and at controlled speeds. Each operation can be regulated individually.

The compactness of these streamlined, fully enclosed tables makes them easy to combine with other equipment. Tooling or fixtures can be evenly spaced about the dial for either 6 or 12-station indexing.

Speed of the table is regulative, and its movement is positively interlocked with operation of the equipment on which it is used. Space inside the table housing permits use of cam tracks, for automatic ejection. Possible variations in applications are almost unlimited. Please write for full details in terms of your own needs.

DENISON *HydrOILics*

HydrOILic Pumping Unit Powers Indexing Table

Power for the Denison Index Table is supplied by this complete and highly compact pumping unit, which can be either a part of the complete machine assembly, or can be installed separately at any point, with connective piping. Available in several models and sizes.

The DENISON Engineering Co., 8153 Dublin Rd., Columbus 16, Ohio

We would like more information on Denison Indexing Tables. We are especially interested in their possible application to:

Type of operation_____

_____

Name_____

Firm_____

Street_____

City_____ Zone_____ State_____

As studies come in, the element standards are posted on the Comparison Sheet; standards for the variables are plotted on their respective curves, and details that define the conditions are recorded. The essential information

Curve Plotting

Curves are used as the best medium for analyzing the trends of variables. They serve also as planning controls for the astute Analyst. He can direct

COMPARISON SHEET

Study No.	G0	G1	G2	G3	G4	G5	G6	G7	G8	G9	70
Dept. + Sect. No.	41-5	28-B2	28 B2	40-10	5-M	28-B	28-B2	28-B2	5-M	28 B2	28-B2
Name of Machine	Lel.Giff.	H.S.M.	ALLEN	ALLEN	ALLEN	Walker Turner	Lel.Giff.	ALLEN	ALLEN	ALLEN	DELTA
Machine Reg. No.	5281	5551	30136	30162	68477	27642	36620	41334	12465	73446	27237
Part No.	45739	60621	130266	131646	4262	560B	6811	7318	855B	8559	3752
Operation No.	2	10	10	4	5	2	6	4	12	3	12
Weight of Jig	2-lbs.	3-lbs.	4-lbs.	5¼ lbs.	3-lbs.	1½-lbs.	2¼-lbs.	1½-lbs.	1½ lbs.	2¼-lbs.	1¼-lb.
Weight of Part	¼-oz.	1-oz.	8-oz.	2-oz.	3-oz.	1½-oz.	2-oz.	¼-oz.	½-oz.	½-oz.	2-oz.
"T" No. of Jig or Fixt.	3491	4648	9044	1326	1446	—	36041	2746	9054	31042	27247
Lubricant or Coolant	S.O.	S.O.	S.O.	S.O.	S.O.	S.O.	S.O.	S.O.	S.O.	S.O.	S.O.
Type of Gauge	—	—	—	—	—	—	—	—	—	—	—
Gauge No.	—	—	—	—	—	—	—	—	—	—	—
Part Material	No. 1018	C.R.S.	1112	1112	10 1018	M.I.	C.R.S.	F.S.	C.R.S.	1112	1112
Operator's Check No.	374	281	185	174	135	135	374	601	445	282	374
Timestudy Man	Henry F.	Ted K.	Ted K.	Joe L.	Tom F.	Tom F.	John T.	Henry F.	Joe L.	Wally H.	Tom F.
Rate	70	55	65	55	65	75	75	65	80	70	50
Pick up piece, place in jig.	.025	.055	.045	.054	.051	.030	.050	.060	.029	.032	.061
Type of jig	0	II	I	I	I	0	I	II	0	0	I
Close + latch gate.	.040	.029	—	—	.031	.032	—	—	—	.045	—
Unlatch + open gate.	.030	.031	—	—	.031	.030	—	—	—	.045	—
Type of latch.	L-1	L-1	—	—	L-1	L-2	—	—	—	L-3	—
Tighten thumb screw.	.035	.042	.027	.071	.032	.042	—	—	.026	.045	—
Loosen thumb screw.	.026	.039	.030	.079	.019	.038	—	—	.024	.046	—
Type of screw.	T-4	T-2	T-4	T-4	T-4	T-3	—	—	T-1	T-5	—
No. of turns	1	2	½	4	½	1½	—	—	1	1½	—
Tighten thumb screw.	—	.027	—	—	—	.028	—	—	.025	.027	—
Loosen thumb screw.	—	.025	—	—	—	.024	—	—	.025	.025	—
Type of screw.	—	T-2	—	—	—	T-1	—	—	T-1	T-4	—
No. of turns.	—	½	—	—	—	1	—	—	1	½	—
Jig to spindle. (slide) Distance.	.029 9"	.023 9"	.011 4"	.024 7"	.025 8"	.021 9½"	.013 5½"	.012 6"	.011 3½"	.020 6"	.04 8"
Spindle to spindle.		.022			—		.031	.025			
Spindle to spindle.					—						
Spindle to spindle.					—						
Withdraw jig. Distance	.023 9"	.030 18"	.015 4"	.022 7"	.025 8"	.030 9½"	.018 5½"	.027 15"	.013 3½"	.038 6"	.022 8"

Fig. 2—A sample Comparison Sheet on which the variables being measured are located in line with the time standards.

recorded is that which permits analysis without frequent rehandling of the actual studies. The Comparison Sheet is simply a large piece of paper for recopying the studies. Fig. 2 shows a sample Comparison Sheet on which the variables being measured are located in line with the time standards. This form is an improvement when the number of variables is large.

the studies to be taken to fill in any possible gaps, and he can tell when he has enough observations. Curve plotting is revealing, however, from another viewpoint. It shows up the difference between data and ordinary timestudy. Ordinary study recordings plot with a shot-gun dispersion like the so-called "scatter diagram" of historical base rates. To me, curve plotting

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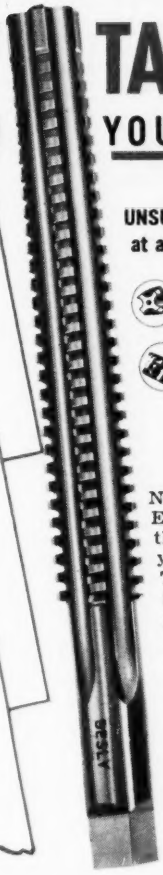

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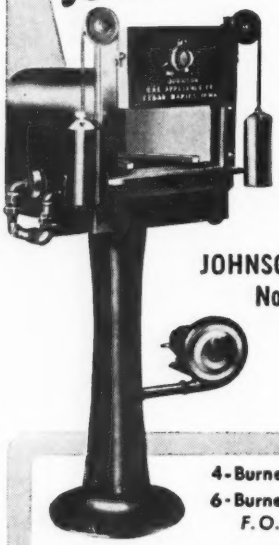
on HIGH SPEED STEELS
Quick Acting
JOHNSON FURNACES



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acts as a Go, No-Go inspection gage and makes clearly evident the difference between the observations of a timestudy man and those of a "rate-setter".

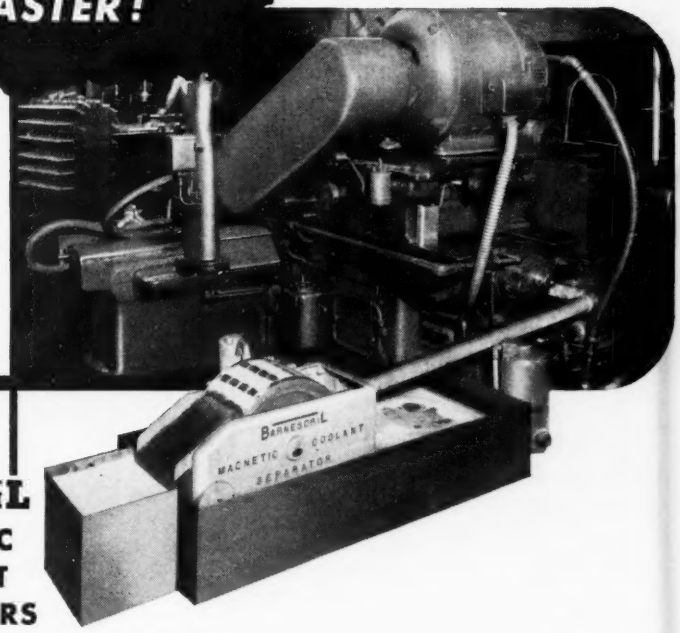
Curves should be plotted for an entire range and not limited to a section of the range which might exist in one department. Variable elements should be plotted as observed, and not in terms of a unit. Too many plotters include constant times which introduce irregularities when divided by some dimensional quantity. Some suggestions on curve plotting are as follows: (a) ASME[2] standards recommend that the horizontal scale be made the Dimension and the vertical scale, the Standard Time; and (b) The pamphlet shows symbols used for distinguishing between curves. My recommendation is to use a color code or symbol for every **suspected** difference in c o n d i t i o n of the variable being plotted. Too many variables finally show up to be a family of curves.

It is recommended that relaxation factors be included when rating is applied so that the Comparison Sheet represents final values. Relax is a term that includes both actual personal relaxation and allowance for fatigue. It might be mentioned that fatigue is often largely a condition of the mental attitude, according to *Fatigue and the Impairment In Man* by Bartley and Chute.

Considering relax, an important detail to be remembered is the fact that, theoretically, the standard should be the same everywhere for a given element of work. Within a plant or organization this must be true, or inconsistencies will appear. Therefore, like elements should include like relax factors. When the curves take on conclusive form, the element standard data is practically finished. The standards for the constants usually have more than enough observations.

2. *A.S.A. Z 15.3—1943.*

Finer Finishes FASTER!



EXAMPLE:
Landis Crankshaft
Grinder

with

BARNESDRIL
MAGNETIC COOLANT SEPARATORS

That's the report on almost every installation where **BARNESDRIL** Magnetic Coolant Separators are on the job removing fine grit and chips. Automatic removal by the separators of this sediment keeps the coolant supply consistently clean, and avoids surface scratches on the work which mar the quality of finish. Finishing is done faster because machines require less frequent shut-down for cleaning.

Production advantages such as these help greatly in reducing finishing costs. Why not investigate the possibilities for application to your grinding, honing, shaving or shaping work. A **BARNESDRIL** engineer will call on request and demonstrate these savings on coolant, maintenance and production costs.

Get a copy of this new catalog describing applications and capacities of all **BARNESDRIL** *Magnetic Coolant Separators. Ask for Bulletin B300E.*

BARNES DRILL CO.

860 CHESTNUT STREET ROCKFORD, ILLINOIS U.S.A.

Working Data

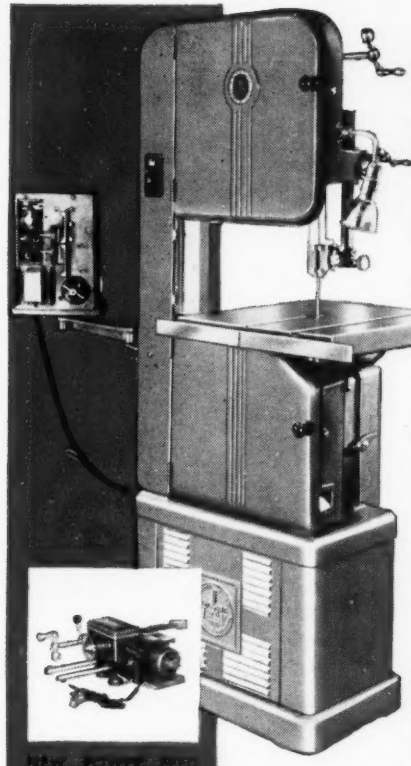
Element data is usually too detailed for efficient use—it needs grouping; and groups should be made up of elements that occur together. Two savings may be made by grouping—(a) a saving in the amount of time required to decide whether or not an element is to be included, and (b) a saving in the number of errors. When practical, the final data in details, groups, tables, and charts should be reproduced on

MACH. REG. NO. 68477 — VERTICAL DRILL PRESS — PART NO. 4262
NAME OF MACHINE ALLEN — DATE MARCH 16, 1950 — OPERATION NO. 5
JIG WEIGHT 3-lbs — DEPT. NO. 5
MATERIAL 10-15 C Brass — SECTION NO. R
LUBRICANT S.O. — PART WT. 302

	PCS/GRAB 2 HANDS	TIME/PIECE	NO.	STD. MIN.
	2-3	046		
	4-6	023		
Pieces on Table from	7-12	012		
Box on Floor	13-25	006	/	006
	26-50	003		
	51-100	001		
	101-200	001		
	201-300	001		
Pick up Piece	0	030		
From Table or	Type I	051	/	051
Box on Table	Jig II	057		
& Load in Jig	III	067		
Remove Piece	0	020		
From Jig &	Type I	027	/	027
Aside to Box	Jig II	035		
Can or Table	III	045		
Spdle.to Spdle-Jig to Spdle-to 17 Lbs.		025	/	026
Jig to Spdle up to & including 6"		013		
Jig to Sp.-Sp.to Sp. & Turn 90°V 180°H		032		
Jig to Sp.-Sp.to Sp. & Turn 180°Vert.		035		
Turn Jig up 90°		025		
Turn Jig over 180°		030		
H to H Larger than #50Dr.Less than 3/4		012		
H to Small.Than #50Dr.or 3/4"to 6"Bet H		022		
Hole to Hole over 6" Between Holes		025		
Spindle up		014	/	014
Spindle Down		025	/	025
(When Hole to Hole)		013		
Withdraw Jig(Dist.Inches) 2-6 6-18 18-36				
Up to 10 Lbs. 013 025		032	/	025
10 to 17 Lbs. 020 030		037		
Close & Latch Gate & L-1 L-2 Latch		060	/	060
Unlatch & Open L-3 L-4 Latch		091		
Gate or Leaf,No Latch Close & Swing out		026		
Loose Bush.PU Insert,Rem.& As.W/Lock		089		
Loose Bush.PU Ins.Rem.& As.W/out Lock		060		
Tighten & Loosen Lock Nut L-5 1/2 turn		057		
Total Col. 1				233

	NO.	STD.
Position & Retract Support Plunger	063	
Trip Feed Lever (KINGSBURY)	012	
Place Jig on & Off Angle Plate(to 10 LB)	050	
Pick up-Place Clamp Rem.& Aside(Rmvbl)	051	
LP-1 Insert In Pc.& Retract(No PU-As.)	050	
LP-1 Pick up-Insert-Remove & Aside	066	
LP-2 Depress & Release in & Out(Spr.Act)	050	
LP-3 (Threaded) 1-T 2-T 3-T 4-T		
No PU or Aside T2--T4 065 092 118 145		
Tighten-Loosen T3--T5 076 106 138 170		
LP-4(Bayonet)Fwd.-Lock-Unlock & Open	056	
LP-5(Threaded) Pick up 1-T 2-T 3-T 4-T		
Screw in Scr.out & As. 120 150 170 190		
LR-1 PU Insert LGT. 1" 2" 3" 4" 5" 6"		
Remove & Aside 050 058 066 073 081 089		
Locate Piece for LR-1	020	
LR-2 PU Ins.Scr. In 1" 2" 3" 4" 5" 6"		
Screw out Remove 1T 130 140 150 150 160 170		
& Aside 2T 150 160 170 170 180 190		
LR-3(Bay.)P/U LGT. 1" 2" 3" 4" 5" 6"		
Ins.Lock-out-Aside 068 080 087 094 100 110		
Tighten & Loosen Screw by hand (to Locate)		
Number of turns		
1/4 1/2 1 1-1/2 2 2-1/2 3 3-1/2 4		
T-1 035 040 050 060 070 080 090 100 110		
T2-T4 045 052 065 078 092 104 118 131 145	/	052
T3-T5 052 060 076 091 106 122 138 153 170		
Tighten & Loosen Screw (To fasten Piece)		
T-1 062 068 080 092 100 116 130 140 150		
T2-T4 082 088 100 118 130 148 160 178 190		
T3-T5 094 100 120 114 160 182 200 220 240		
C-2 Clamp on & off Piece	022	
Cam Lever Tighten & Loosen(Movable Jig)	049	
Cam Lever Tighten & Loosen(Fixed Jig)	036	
Total Col. 2		052
Total Col. 1		233
Total Page 1		285

Fig. 3—First side of Data Sheet on vertical drill press operation.



NEW POWER FEED protects blade against distortion. Motor driven, it maintains a pre-set feeding pressure. Easily adjusted for blade condition and various types of material.

walker-turner DIVISION

Walker-Turner *design* makes this *new* 16" BAND SAW a *cost-cutting* machine

YOU'D have to *work* with the revolutionary Walker-Turner 16" Band Saw to appreciate its speed and accuracy. Cuts sheets, rods and tubes of steel, iron, aluminum, brass, alloys and molded plastics.

Secret of its high operating efficiency — yes, and moderate initial cost—is Walker-Turner unit design. Every basic part of this new machine is completely functional!

Find out about Walker-Turner *designing.* Send for new catalog describing the complete Walker-Turner line of metal-cutting machines, designed to cut operating costs and increase output. See your local Walker-Turner dealer or simply mail coupon.

FOR LONG-RUN, TROUBLE-FREE SERVICE

- All wheel bearings heavy duty precision ball bearings.
- Heavily ribbed, carefully machined table tilts to 45°; mitre gauge groove.
- Wheels are carefully balanced and rubber faced.
- Blade guides have ball bearing thrust wheels and adjustable steel guides designed especially for metal-cutting.
- Blade tensioning devices have spring cushions to absorb shocks.
- Guard construction assures complete protection to operator.
- Heavy cast-iron, one-piece frame for extra strength and rigidity.

Walker-Turner Division, Kearney & Trecker Corp.
Dept. MM4, Plainfield, N. J., U. S. A.
Please send me FREE copy of the new Walker-Turner Machine Catalog.

Name .....

Firm .....

City ..... Zone ..... State .....

KEARNEY & TRECKER MILWAUKEE

WALKER-TURNER DIVISION

PLAINFIELD, NEW JERSEY

8½ x 11 inch paper and set up as shown in Figs. 3 and 4.

The following procedure is then followed so that standard setting clerical work may be reduced to a minimum: (a) Write in the identification of the work; (b) Circle the details applying; and (c) Add the standards.

Any other arrangement usually requires the writing of details copied from other places which increases the percentage of error.

CLEAN	CLEANED EVERY 1	2	3	5	10	25	50	100	NO	STD. MIN.
MACH 1	058	029	019	012	006	(002)	001	001	1	002
TABLE NO. 2	074	037	025	015	007	003	002	001		
WITH of 3	090	045	030	018	009	004	002	001		
SCRAP-SP 4	110	055	035	022	011	004	002	001		
ER USED 5	130	065	043	026	013	005	003	001		
6	150	075	050	030	015	006	003	002		

CLEAN JIG			
Dump Chips up to 10 Lbs.		032	
10 to 20 Lbs.		040	
Clean Temp.-Type "O" Jig W/Brush		030	
Clean Type I-II-III W/Brush		060	
Wipe Seat in Jig with Finger		030	
Blow off with air hose		060	
Flush jig Type "O" & I up to 4 Lbs.		032	
Flush jig others		057	
Dip in pail of S.O. up to 2 Lbs.		040	
Dip in pail of S.O. 2 to 4 Lbs.		062	1 062
Dip in pail of S.O. 4 to 8 Lbs.		070	
Oil tool	Finger	035	
	Brush	047	
PU Pl.Temp. Loc.by	One S-1 or Side	050	
Off & As. Loc.by	Two S-1 or Channel	067	

Screw bushing tighten & Loosen(Cup or Nest)

1/2T	1T	1-1/2T	2T	2-1/2T	3T	3-1/2T	4T
078	098	119	140	159	180	200	220
060	076	091	106	Not Cupped			

MISCELLANEOUS ELEMENTS	STD.

GAUGE PIECE	OCCUR	STD.

TOTAL COL.	3	064
TOTAL PAGE	1	285
TOTAL		349

TOOL	DIAM. OR SIZE	DEPTH	FEED	STD. RPM	MACH. RPM	EXP.	NO.	STD. MIN.
DRILL	#2	.250		1650			1	.051

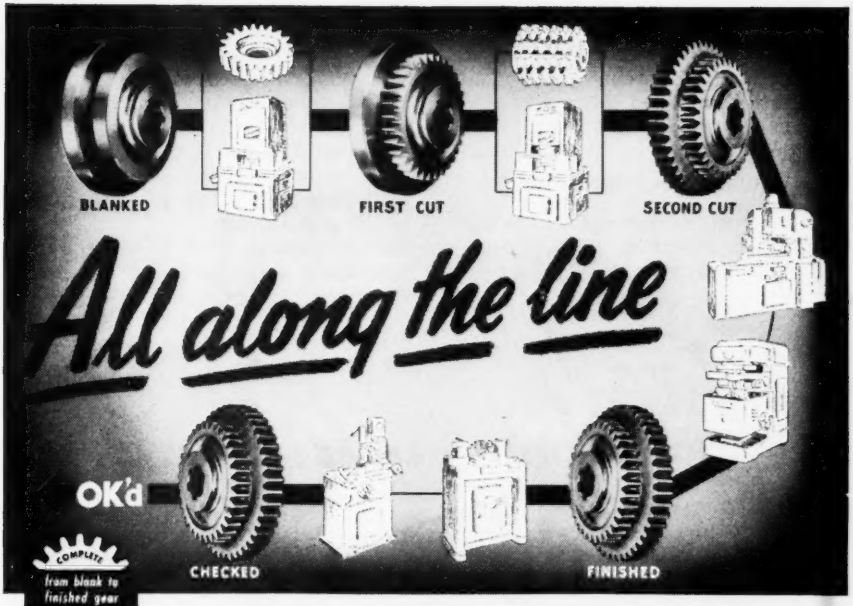
CORNERING OR C'SINK

HOLES ONE SIDE	HOLES OTH. SIDE	SING DPTH	DOUB DPTH	TABLE	HAND	DIST

MACHINING TIME	051
TOTAL EXPENSE	
TOTAL HANDLING	349
TOTAL STANDARD	.40

SET BY

Fig. 4—Second side of Data Sheet on vertical drill press operation.



We're in the business of cutting gear COSTS—ALL ALONG THE LINE . . . with machines, with tools . . . and WITH SOMETHING ELSE.

Sure we make all types of hobs, shaper cutters and miscellaneous gear tools; gear finishing machines (10 different models) for every kind and size of spur and helical internal and external gear. Sure we developed pre-shave hobs and cutters, Sine-Line gear and hob checkers (13 machines) plus Shear-Speed machines (4 sizes) to cut gears as fast as they can be finished.

But that's only part of the story. Tools and machines are like ingredients in a good stew. Each must be good, but you must also mix them correctly

When you do:

. . . you can frequently HOB AND SHAVE a gear in LESS TIME than it takes just to hob it. You can also wind up with a lower TOTAL tool cost.

. . . you can cut total tool-change down-time with machines on which you change tools *more* often.

Crazy? Not on your involute.

. . . you can reduce cost of gear cutting by making a change in a *different* operation.

. . . you might get *more* output by *cutting* capital investment in new equipment by 80%.

. . . a different cutter width could easily cut shaving time in half.

Would you like to get your gear cutting tools "for nothing"?

. . . savings in re-grinding time can more than pay for the tools.

. . . raising your gear checking costs could cut over-all gear costs.

Impossible? They've all been done—many, time and again—by Michigan Tool engineers while cutting gear costs ALL ALONG THE LINE for somebody.

How much can we cut yours? Let's find out. Give us a ring or drop us a line.

COMPLETE from blank to finished gear EQUIPMENT

MICHIGAN TOOL COMPANY 7171 E. McNichols Road Detroit 12, U.S.A.

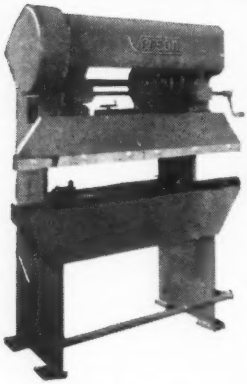
Figs. 3 and 4 show two sides of a sheet set up for the example drill press operation which have been completed as suggested. Other examples of charted data are included. All are based on the customary 60 Unit Normal task.

General Specifications

In the element description, the work included is specified. With Standard Data, one must go a great deal further by specifying all of the contingent conditions. Careless descriptions in this final write-up may cause endless bickering when subsequent changes are made, and changes are certain to be made unless the organization is a dead one. Therefore, the Analyst must prepare a complete writeup to cover every possible detail that he and his group can foresee.

The writeup must spell out the qualifying applications of the Standard Data with distinct limitations of the range covered. Where the write-up fails to be specific, either an "old" standard will be continued in the event of a change in conditions, or the process of preparing data will have to be repeated anew. Data cannot be patched.

Slash
metal forming costs...



Shops that are wasting manpower with hand brakes or tying up big machines with small odd jobs have the answer to their problems in the new Verson 16-48 Press Brake. Compact and low in cost, the 16-48 brings the advantages of power operation and big brake design to smaller shops. Bed and ram length is 48". Capacity ranges from a 48" length of 16 ga. steel to a 24" length of 10 ga. steel. Allsteel construction assures perfect alignment and maximum rigidity. Write for a copy of Bulletin 16-48A; it gives complete design details, specifications and capacities.

VERSON ALLSTEEL PRESS CO.

9310 S. Kenwood Ave. CHICAGO 19, ILLINOIS

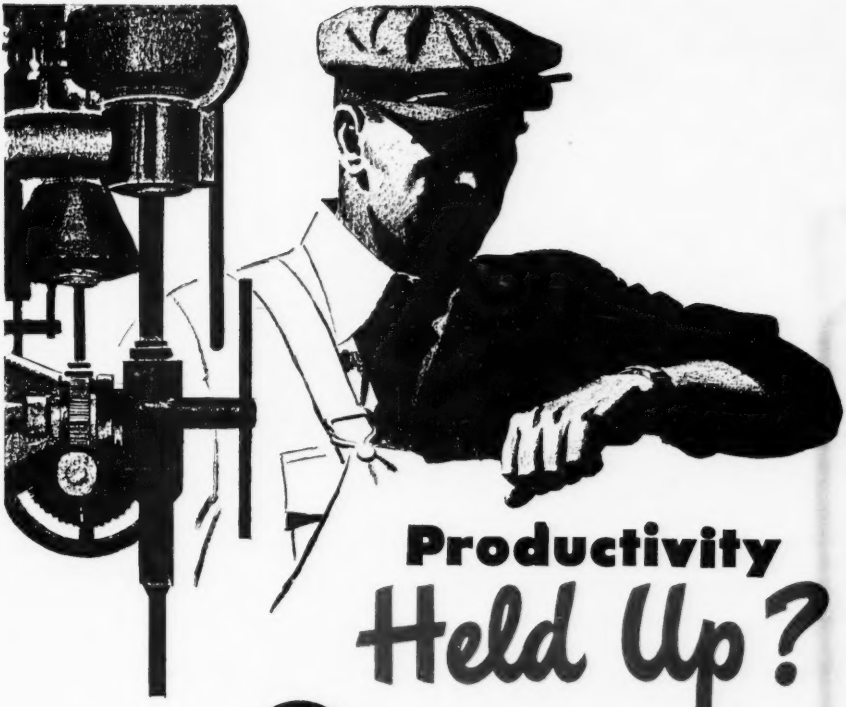
Holmes St. and Ledbetter Dr. DALLAS 8, TEXAS

THERE'S A VERSON PRESS BRAKE FOR EVERY JOB FROM 15 TONS UP!

Advantages

In conclusion, it seems important to mention certain advantages of Standard Data in the administration of incentives.

(1) It is the only practical method for measuring so-called indirect labor operations. That is important because, in my opinion, either we supply incentive measurement or we grant some



Productivity Held Up?

Held up and robbed by a lack of steel bars and shafting? Yes, robbed of productivity and profits for every minute of "down-time"—lost because you didn't have the size and shape you needed.

Many a plant and shop in your area has solved this "hold up" problem by doing away with their own stock of steel bars and shafting. They use instead the ample, widely diversified, classified stocks carried by the Union Drawn Distributor. His deliveries are fast and only as needed—a bar at a time or a truckload.

Get a copy of HIS stocklist today—and end *your* productivity "hold ups" from here on!

PHONE YOUR UNION DRAWN DISTRIBUTOR *Today!*

REPUBLIC STEEL

Republic UNION

COLD DRAWN STEELS

Table II

Operation	Number of timestudies taken for data	Number of standards set in one year	Per cent coverage timestudies would attain
Coremaking	60	7,500	0.8
Snag grinding	40	656	6.1
Visual Inspection	53	422	12.6
Turret Lathe Operation	100	600	16.7

wage increases. Wages increases would raise costs and reduce the real incentive earnings of those who are measured. Hence, Standard Data provides a way to approach 100 per cent coverage.

(2) Coverage is increased by the efficiency of the method. Some illustrations, as shown in Table II will make the point clear.

The last column in the Table is the per cent coverage that would have been attained had the timestudies been used for individual "ratesetting".

(3) Coverage is extended by data which is correctly worked up to include the actual variations in working conditions. This was touched on when we said, "Study conditions as they are." Those conditions encountered will be repeated, and we must "put the job on Day Work" or make an expense allowance for the irregular condition. Every one loses when incentive is taken off and, more important, management cannot be shown how expensive the irregularities actually are. Standard Data, prepared with foresight, can be made complete enough, as I like to state it, so that the "Standards Department can change standards faster than the shop can change methods."

(4) Administration can be improved

MULTIPLE DRILLING with a...

MULTI-DRILL

Increases Capacity Up to 800%
ADJUSTABLE TO ANY HOLE PATTERN
. . . FITS ANY DRILL PRESS

If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern—is compactly built to permit easy, unhampered operation with drill jigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as ½"—handle drill sizes up to ⅜" in steel. Special adaptations available.

There is a Commander MULTI-DRILL Distributor in your area. Write for his name, literature and complete details.

See us at Booth No. 426, ASTE Show, Philadelphia

COMMANDER MFG. CO.
4224 WEST KINZIE ST. CHICAGO 24, ILL.

Product of *Commander* — Builder of the *Commander Tapper*

Instantaneous Setting...Precision Plus

...when you finish grind on TAFT-PEIRCE Surface Grinders

Thanks to a new Vernier feed, now available for Taft-Peirce Surface Grinders, super-precise finish grinding no longer is dependent on guesswork. Vertical or horizontal settings of .0001" can be made instantly . . . exactly. Consistent accuracy is maintained easily . . . work output increased materially . . . spoilage losses are reduced.

Large handwheels, graduated in thousandths, rough position the wheel. The Vernier is then engaged to provide settings in tenths. This new accessory is available for installation on all Taft-Peirce Surface Grinders . . . old or new.

MAIL TODAY! ...for detailed information

The Taft-Peirce Manufacturing Co.
WOONSOCKET, RHODE ISLAND

Please send me specifications on the .0001" Vernier for The Taft-Peirce #1 Precision Surface Grinder ( ), The Taft-Peirce 6" Rotary Surface Grinder ( ).

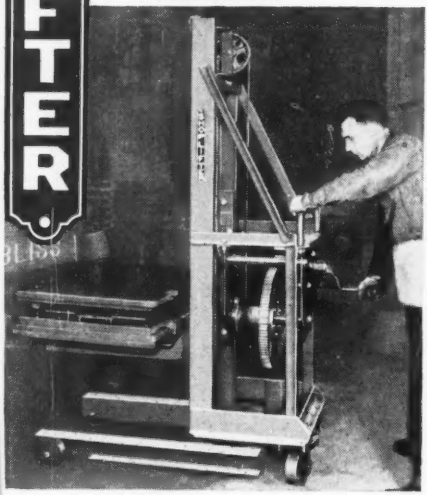
Name .....

Company .....

Street.....City.....State .....

SHOPLIFTER

. . . let an Economy SHOPLIFTER do the heavy work around here.



Every shop needs a SHOPLIFTER. Saves men, saves materials. Besides handling heavy dies, the SHOPLIFTER can stack drums and boxes, unload street trucks, pick up skids and be used as an adjustable height table.

All steel, arc welded frame. Easily operated hoist unit with automatic brake, safely holds load at any height.

500 pound capacity

Type D, hand operated.....$157.50
Type DE, electric 1/3 HP unit.....$315.00

1000 pound capacity

Type DX, hand operated.....$320.00

2000 pound capacity

Type DX, hand operated.....$370.00

Floor lock to hold machine steady:
$10.00 extra for 500 pound sizes;
$15.00 extra for type DX models.

ECONOMY ENGINEERING COMPANY

4507 W. LAKE STREET • CHICAGO 24, ILL.

in shops having unions by using Standard Data since this method is more fair. To understand this important phase, the reader has only to look through the numerous clauses concerning timestudy that have been inserted in some contracts. Most of these clauses are directed at the individual timestudy procedures as shown in the following list of typical subjects covered:

(a) Who shall be timed?

(b) How many cycles to study?

(c) What type of watch reading?

(d) How many abnormalities can be omitted?

(e) Who shall be present and initial the study?

All of these regulations reflect adversely on our abilities as timestudy men. Some of these controls are deserved, but they will not help to attain the consistency which they were designed to accomplish. In my opinion, they make for greater inconsistencies. Regardless, the Standard Data method will make these restrictions unnecessary; and, at the same time, Standard Data can attain the consistency sought.

(5) Almost every grievance involving timestudy arises from an individual operator. With data, it can be demonstrated that all of the elements allowed are the same as those included in standards set for similar work that he or others do. Any differences that exist because of irregular conditions can be quickly adjusted.

(6) Finally, Standard Data is basically fair in that it is built up from many studies, taken by several timestudy men, of a wide variety of operations, performed by many people. In summary form, it is the closest we have come to correct measurement of the Normal qualified employee. Hence, standards set from data are as fair as we know how to make them. The basic fairness is the most important result we can achieve through the use of Standard Elemental Data.

THE *chips* TELL ANTISEP'S STORY

One look at the two samples of machined chips pictured above, and you will see why Antisep All-Purpose Base was chosen for use in many machines, including automatic screw machines.

This comparative machining of SAE 1045 steel was done on the same automatic, the only variable being the cutting fluid itself and the increased speed Antisep permitted. Examine the chips, then read the facts at the right, and you will understand why this particular plant—and so many others—have standardized on Antisep All-Purpose Base.

It's easily miscible with water; high in saponifiable and anti-welding properties; can be used for 90% of your cutting needs; costs only about 7c a gallon as diluted. For more facts, write for illustrated leaflet, or better yet, tell us you want to try Antisep A. P. Base on a comparative basis, in your own shop.

HERE'S DETAILED PROOF

	Former Coolant	*Antisep A.P.Base*
Dilution	1:10	1:30
Speed	200 RPM*	300 RPM
Feed	120 FPM	180 FPM
Time per piece	60 sec.	37 sec.

**Above this speed, machine chattered — but not with Antisep.*

E. F. HOUGHTON & CO.

303 W. Lehigh Ave., Phila. 33, Pa.
Service and Sales in all principal cities

Sales Hints for the Smaller Shop

Karl F. Kirchhofer

Continuation of the discussion on the use of direct mail as a medium of obtaining business orders.

By Karl F. Kirchhofer

THE subject of a mailing list and how to build it will be discussed in this month's column. Even the finest, most convincing, and most effective sales letter, accompanied by a brochure or folder written by an outstanding direct mail expert, will be doomed to failure unless it is sent out to logical, up-to-date prospects who can use what you have to sell.

During twenty years of direct mail experience, my favorite form of reading matter has become the classified pages of telephone directories from cities all over the country. I have purchased literally hundreds of directories and have built up many mailing lists which, when used properly for direct mail purposes, have resulted in heavy profits. Everybody in business has a telephone, and every firm with whom you would want to do business is usually listed in the classified pages of a directory under a particular type of business activity.

Therefore, if a small metal-working plant manufactures a specialty that is used by beauty parlor operators, it would be wise for the plant owner to obtain telephone directories from all of the cities in his trading area, or from all over the country for that matter. He can then compile a list of beauty parlor names and addresses and begin his direct mail campaign using the compiled list. These directories are sold by telephone companies for a nominal sum, and lists of thousands of your most logical prospects all over the country may thus be compiled easily and at a relatively low cost.

If you make a special tool which is used by carpenters, and if you sell direct, a small expenditure will provide a list of as many names as you can handle. If you make a machine tool accessory, the classified pages of telephone directories will again provide lists of firms engaged in various activities in the metal-working industry. And if you make a tool that may be used to speed up or simplify the job of a gasoline filling station operator, your best prospects may be found listed by the thousands on the classified pages of various directories. If you wish to build up a list of all plants within a hundred mile radius for the purpose of intensive coverage by direct mail and by personal calls, simply buy all of the telephone books

of towns in the area, including those of the smallest towns, and then cut out and paste up the desired lists on sheets of paper, thus making the job easier for the multigrapher or letter service shop which may do the addressing.

There are, in addition, long-established list brokers who are able to provide, quite quickly, just about any type of list you might possibly want. Or, if a broker does not have on hand a list such as the one requested, he will frequently compile one for you at a special consideration.

The trade journals in your particular field provide another excellent source of prospect names. Magazine reporters and correspondents are constantly on the alert for news of new companies, changes of any sort, and new developments. The names mentioned in magazine news items may mean new names for your mailing list. Of course, one of the most logical of all ways to build up a live, up-to-date list is to advertise consistently in those journals that are read by the people who buy your products and add to your list the names of those people who respond to your ads. Publicity releases about your company will also produce inquiries, and names of the inquirers should also be placed on your list.

The trade journals in various fields often are able to provide lists of names that might ordinarily be difficult to obtain from other sources. For example, a manufacturer of watchmaking precision tools, for whom the writer often prepares mailing pieces and publicity, wanted a list of names of all of the schools in the country at which watchmaking was taught. A telephone call to the office of a journal in the horological industry resulted in the arrival by mail the following day of a list containing the names of about 95 watchmaking

fabricated to your specifications

When designing new machines or redesigning old ones, remember Fabricated Bases are stronger; remember too that Littleford can fabricate shapes from plate and sheet metal to fit any machine, any size. Skilled workmen and modern equipment for shearing, flame cutting, punching, bending, rolling and welding are your assurance of quality work at low cost. No matter what your base problem may be, send blueprints to Littleford for an estimate of cost. Send also for Bulletin on Littleford Fabricated Bases.

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schools, which were at that time specializing in teaching the trade to students attending under the G.I. Bill of Rights. Small as this list was, a few letters, each accompanied by a folder, produced more than $5,000 worth of orders. In another case, a distributor desired a list of all of the pawnbrokers in the country. This list was obtained from a regular list broker and produced excellent results in the sale of tools to the pawnbrokers.

Many trade papers offer a direct mail list service to advertisers and others who pay a fixed fee per thousand for the privilege of having their mailing pieces and envelopes addressed with names from the publishers' lists. From my own experience, I can say that this is one of the best of all list sources. A trade magazine is mailed periodically to a list of readers; and whether the magazine is of the paid subscription or controlled circulation type (distributed without charge to a carefully selected list of names in a given field, such as MODERN MACHINE SHOP), the magazines are mailed out weekly, bimonthly, or monthly, generally the latter. Thus the lists are "cleaned" every time a mailing is made. If a publication is returned stamped, "Address Unknown", either an effort is made to locate the new address of the reader, or else the name is removed from the list.

No publisher knowingly sends his book to people who have gone out of business or who have moved to unknown locations. Of course, it sometimes happens that a person's name is listed incorrectly by a publisher, or that a person to whom a magazine is being sent at a given company is no longer employed by that company. Generally however, there is a replacement for the man who is no longer with the company, and the issue will

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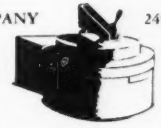
LINDBERG  **FURNACES**

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be read anyway. In the case of paid periodicals, name errors will be discovered at renewal time. In the case of the controlled circulation papers, incorrect names or uninterested recipients are discovered from magazine returns and from frequent questionnaires that are mailed out and returned by people on the mailing list. The questionnaires contain questions concerning a reader's authority, his purchasing power, and the like, and usually include a direct question as to whether or not the reader wishes to continue receiving the paper.

If a negative answer is received to this latter question (this is usually infrequent), that reader's name is removed immediately from the list, and another name is substituted. In these days of skyrocketing printing and production costs, no publisher of a controlled circulation paper wants to continue to mail his publication to people who do not read it or want it. He is naturally anxious to give his advertisers as responsive an audience as possible. This statement is also applicable to the publisher of a paid circulation magazine, although his readership is not as selective; the publisher wants to sell his book where it will do his advertisers the most good.

I have obtained excellent results and built up a profitable mail order business, particularly in the sale by mail of specialties, by using the direct mail service of metal-working trade journals. Therefore, if your product is used in the nation's shops, or warehouses, or steamships, or banks, consult an advertising representative on the staff of a trade journal in your field, or in the field you want to reach, and ask his advice concerning the use of his lists for direct mail purposes.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

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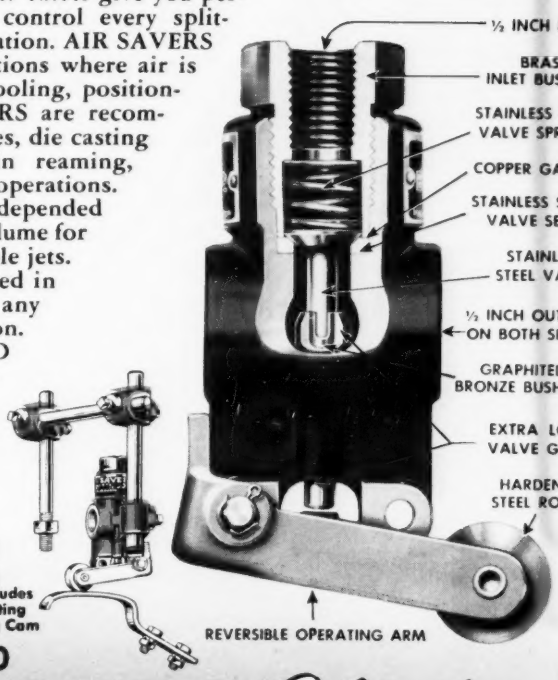

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Rough grinding heavy weld bead prior to finish grinding with same wheel.

Notching risers on ferrous casting prior to knocking off with sledge.

Smoothing surface of large brass casting. Note how easily wheel gets into corner.

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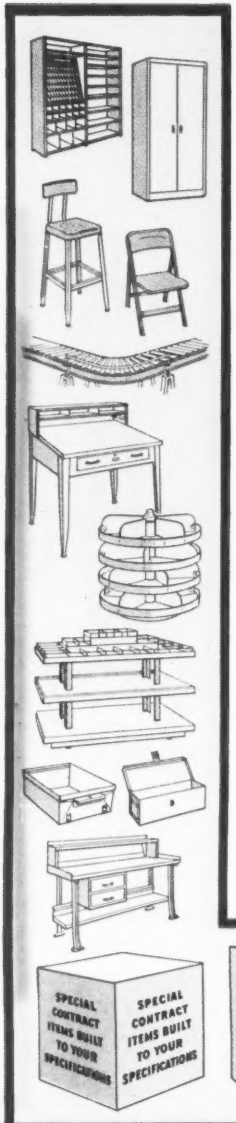

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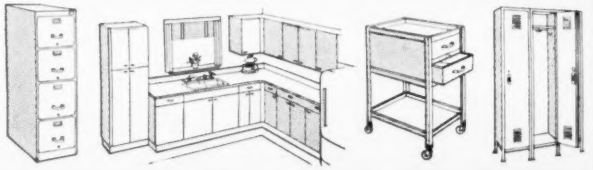

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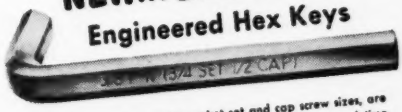

Key size, and corresponding socket set and cap screw sizes, are clearly stamped on arm of key. Eliminates guesswork and time wasted selecting the right key. The Size-Mark is especially useful in training new help.

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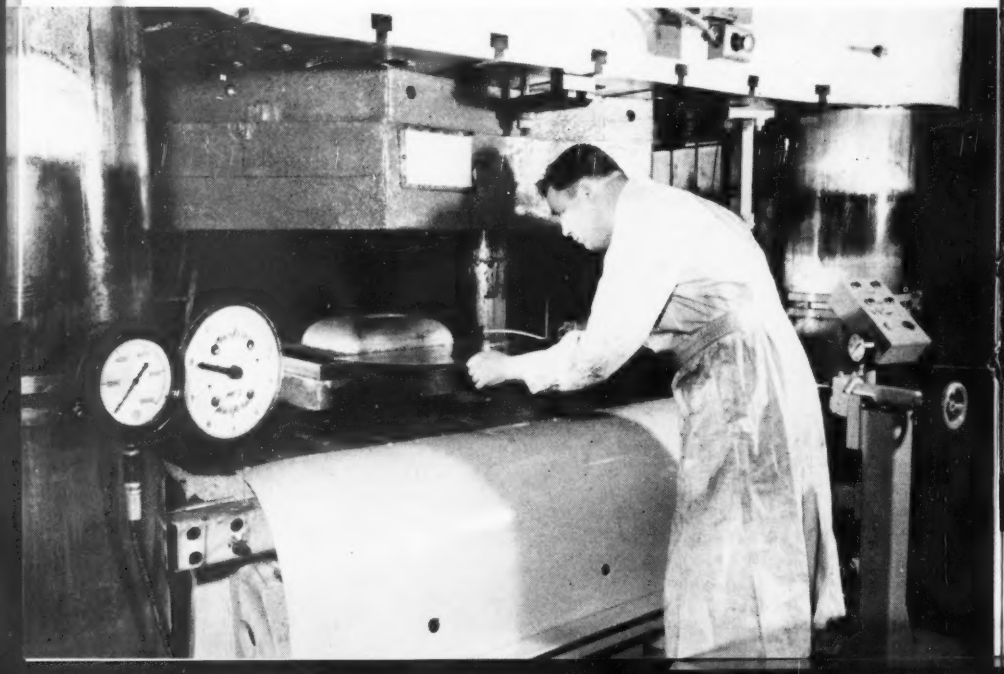
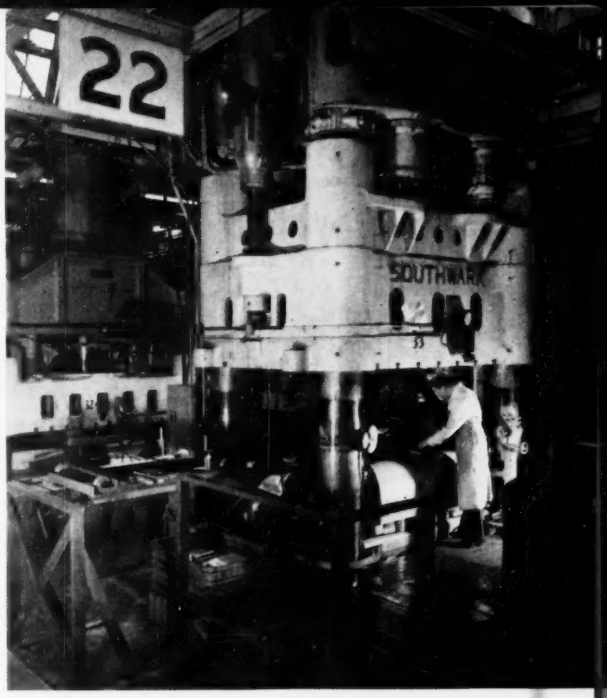
High Quality Forming at Less Cost

THE development of a new metal forming process by Glenn L. Martin Company of Baltimore provides for the production of high quality stampings at a substantial reduction in tooling costs, particularly in industries which require a multitude of different parts and a relatively small quantity of each part. The process, known as Marform, was designed to combine the forming ability of a steel die with the economical tooling of the Guerin process. This objective has been obtained to a high degree although certain minor compromises have, of course, been necessary.

For example, the Marform process utilizes the same simple male punch employed in the Guerin process but it also requires rests. It is therefore unnecessary to make either a female die, pressure plate or draw ring. This means that it is unnecessary to make half of the tool formerly required for a drawn part but this fact saves more than half the cost of the tool in many cases for several reasons. The first reason is the fact that the female portion of the tool is often the most difficult to make since it is more difficult to work down in a hole. The second and most important reason is the fact that the

Close-up view showing an operator at The Glenn L. Martin Company placing a blank on the tool of a Marform metal forming unit.





This illustration shows two presses at The Glenn L. Martin Company containing Marform units. The press in the foreground is a 3500-ton press and contains a Marform No. 2 unit. The one in the rear is of 800 tons capacity and utilizes a Marform No. 1 unit, the original machine.

matching problem between the two halves of the tool has been eliminated. This matching work is of course very tedious and costly .

The Marform punch can be made of Masonite for short runs on soft materials. Cast Kirksite can be employed for longer runs or harder materials. However, steel punches are generally employed for production runs, especially on harder materials. The flat plate on which the metal rests is always made basically of steel. This plate must be flat and smooth but the fit between it and the punch is unimportant except when forming very thin metal such as ten or twenty thousandths thick stock. However, a thin Masonite overlay is often employed on the steel plate on short runs to save the cost of grinding the surface of the steel plate. The inside periphery of the plate, where it surrounds the punch, and the outside periphery of the plate can be torch cut in most instances.

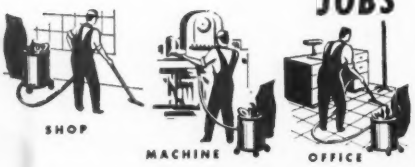
In the Guerin process, set-up time on a tool is negligible and any arrangement of tools can be distributed around the lower platen. This is an important cost item when you compare this situation to the time and effort involved in setting up a steel die. The Marform process again strikes an effective compromise between the two. Here the set-up time on a tool is relatively small since the male and female portions of the tool do not have to be matched and since more than one form block can be used in one pressure plate or in separate pressure plates on the same machine. The pressure requirements and depth of stroke must of course be equal, however, for all parts formed at the same time.

A 40 per cent reduction in area is generally expected on a steel die when forming aluminum alloys, for example; a reduction in area of 50 per cent can be attained if extra diligence is exercised. However, a reduction in area of 57 per cent is considered normal in Marform work on the same material and figures as high as 70 per cent have been attained in testing operations.

In like manner, a cup depth equal to the radius is normally expected from a steel die, while a depth equal to 1½ times the radius is normally expected in Marform on the same material and depths equal to 1.2 times the diameter, or 2.4 times the radius, have been attained in certain cases. All of this means that the Marform process can sometimes form a part in one opera-

* VAC-IT

does all your cleaning JOBS



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tion that would otherwise require two operations.

There are several apparent reasons for this added formability. One of the most obvious reasons is the fact that the rubber has a certain cushioning effect and therefore prevents rapid application of strain at any point on the

Here a Martin operator is shown making an adjustment to the pressure control on a Marform machine.

metal in contrast to the situation in a steel die where localized applications of strain may on occasion be quite severe.

The rubber also exerts a lateral pressure during the forming operation which is a direct result of the applied forming pressure. This lateral pressure has the effect of locking the metal

more *power per ounce* than any other wrench

New Reversible Air Impact Wrench (CP-3440), with ⅜" bolt size capacity, is in a class by itself for tightening and removing nuts and bolts . . . driving and removing wood screws, lag screws, studs . . . tapping.

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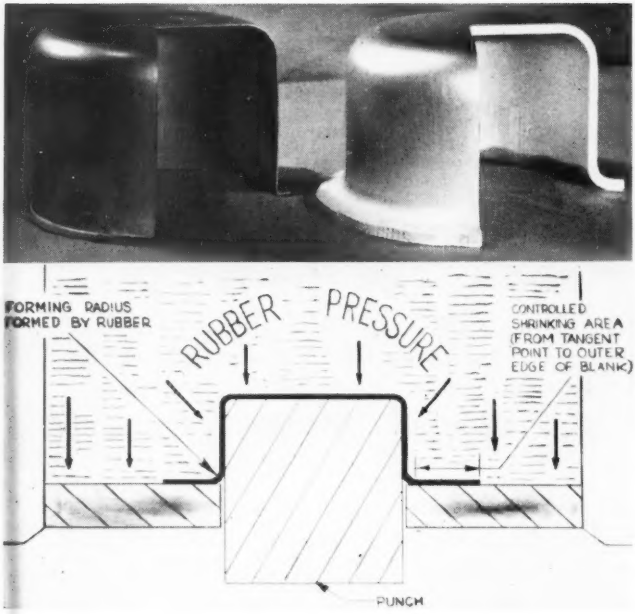
FORMING RADIUS FORMED BY RUBBER
RUBBER PRESSURE
CONTROLLED SHRINKING AREA (FROM TANGENT POINT TO OUTER EDGE OF BLANK)
PUNCH

This illustration shows two parts — one of 0.030 - 1010 steel; the other of ¼-inch thick 61s0 aluminum. Both were formed by the Martin Marform process on the same tool with a single stroke. This sketch illustrates the Marform punch and the Marform plate on which the as yet unformed metal rests. These two elements constitute a Marform tool. The rubber in the Marform retainer is also illustrated along with the fact that the rubber pressure is exerted in all directions against the part.

already formed to the male portion of the tool. This prevents an accumulation of strain at the punch radius, and thereby causes the strain to be distributed very uniformly over the complete surface of the piece to be formed. The importance of this fact is readily demonstrated by the fact that most steel die formed parts which fail, fail when the top pops out of the part, with the failure along the line of the punch radius.

The prevention of concentration of strain at the punch radius not only enables the part to be formed deeper but also causes the part to be more satisfactory in certain applications where uniform thickness is important.

There is another related advantage in the fact that the rubber locks the material against the punch. This arises from the phenomenon that very local elongations in metal can safely be higher than elongations over a relatively longer gage length. The rubber automatically causes the metal to be strained over a much shorter gage

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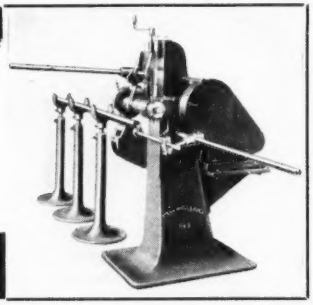

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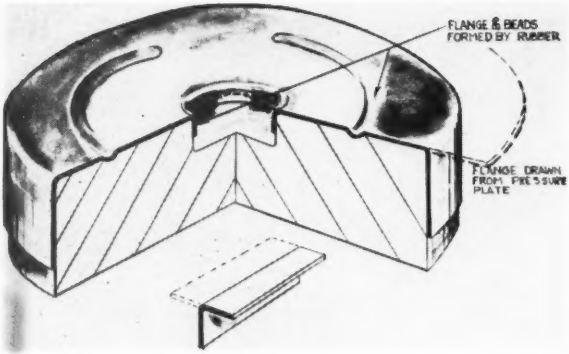

This illustration depicts the various fundamental types of formed shapes. The bead impression in the top surface of the metal cup and the flange on the hole in the center of the metal cup require stretching action in the material in their formation. The outside flange of the cup requires a shrinking action while the small illustration toward the bottom is a bending action.

length by locking it just above the instantaneous point of forming and therefore provides the elongation available from the shorter gage length.

The third factor which enables the Marform process to form a deeper part in one operation is the ability of the machine to provide an exact required pressure on the material at each desired depth of stroke. This pressure can be varied in either direction, in other words, it can start low, be increased, and then drop off, or, it can gradually be increased from start to finish, or it can be started at a high value and then dropped gradually to a lower value. The pressure variation can be infinite within the minimum values, and therefore it is not a series of steps.

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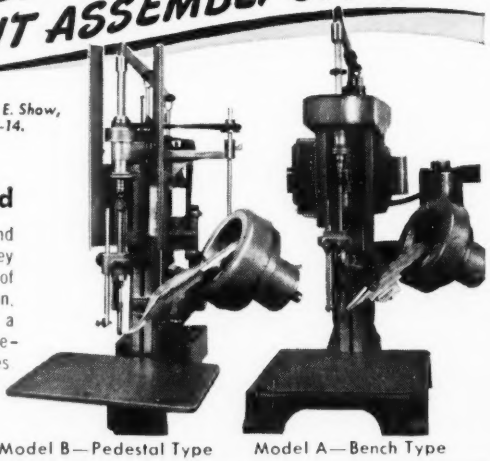

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MODEL 50 - 1 HP, 1000 CFM.

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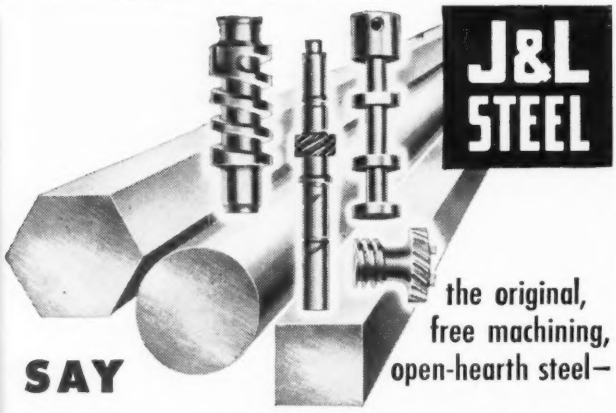
There are several other advantages from a forming standpoint in the Marform process, such as the precision with which a given shape can be formed. Sheet metal parts can be made to a tolerance of plus or minus .002 of an inch. A tolerance of plus or minus .005 of an inch is commonly obtained on parts where the shape is sufficiently rigid to maintain such accuracy.

Material as thin as .010 of an inch thick has been successfully formed and a .012 gage cup was deep-drawn to the point where the depth of the cup was .9 of the diameter of the cup. Gages as thick as .675 in aluminum alloys and .102 in 1010 steel have been formed. This is not necessarily the maximum but only represents the thickest gages formed to date.

The problem of applying finishes to formed shapes is sometimes critical from the economy standpoint. This is particularly true of polished surfaces. It is more economical to polish material in the flat state and then form the parts. This results in marred finishes when the normal processes are used. However, round cuts have been formed on the Marform machine successfully where the material had been previously coated with such finishes as Vinyl, Aircraft paints, and crackle paints. This experiment was also performed with polished material.

Tapered shapes are a major forming problem. Since any tapered shape tends to wrinkle, due to the distance between the punch and the pressure plates of the die at the start of the



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Sturdy Drill Sets—*of High Speed Steel*—especially built to withstand the shock and strain of Electric Hand Drill use. Adequate length for normal portable tool use—attractively priced. Utility packaged in protective heavy canvas case that may be rolled or folded and carried in the pocket. Set #S-13—13 High Speed Drills, 1/16" to 1/4" by 64ths; Set #S-11—11 High Speed Drills, 1/16" to 3/8" by 32nds; Set #S-8—8 High Speed Drills, 1/16" to 1/2" by 16ths.

Wood Boring Drill Set, No. 14—Built to deliver maximum efficiency in 1/4-inch Electric Hand Drills. New, improved design—these drills produce unusually smooth holes—cooler running—faster chip disposal—diminish stalling on "break thru", tempered to prevent damage on contact with metal. Attractively priced. Set consists of 5 drills—1/4" to 1/2" by 16ths—all with 1/4-inch round shanks.

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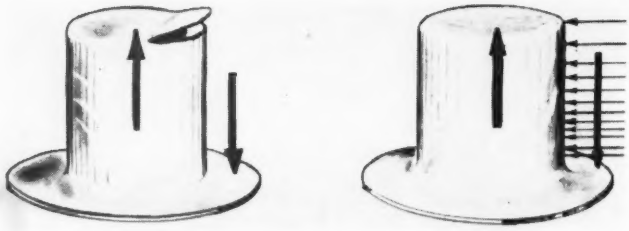

The illustration at the left shows the forces on a piece of material when a deep drawn cup is formed on a steel draw die. The large arrow pointing upward in the center of the cup illustrates the force applied by the punch. The large arrow pointing downward on the flange of the cup illustrates the force applied by the pressure pads. The fracture shown is a typical failure. The illustration at the right shows the forces acting on the same cup when the same part is formed on a Marform machine. The horizontal arrows in this view indicate the lateral pressure of the rubber which locks the material against the punch.

forming stroke, tapered shapes are important to industry because they are attractive, because they will stack better, and because they save metal. The Marform process has the definite advantage on tapered shapes. It is difficult to quote a rule on what can be accomplished with our limited experience to date, but the following examples will serve as a guide as to the severity of taper which can be formed without wrinkles. Consider a four-inch diameter on the top of the punch and with a taper outward toward the bottom of the punch. On such a punch the gap could be ½ an inch between the punch and supporting pressure plate, for .025 thick steel. This gap can be increased to ¾ inch with the gage of the steel increased to .050. The gap can

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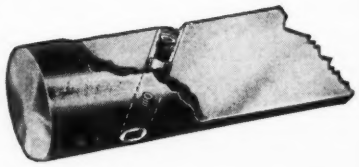

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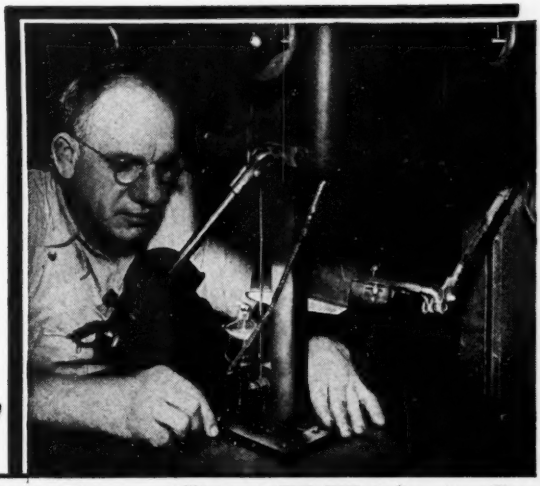

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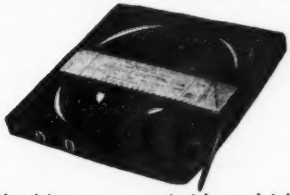
ATLANTIC SAWS meet all of your requirements for a superior blade on complicated die and fixture radius cutting. ATLANTIC specializes in accurate milled and precision set teeth, hardened to exact temper.



Atlantic's strong, practical box, plainly marked on sides and top. Remains in good condition until entire coil is used.

ATLANTIC'S special alloy steel insures longer wear and easier welding.

ATLANTIC'S one temper saw for all metals reduces stock you have to carry. Cut to length and welded, ready for use. Packed in strong Atlantic box. Write for new Atlantic Catalog.

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INCORPORATED

Exclusively Manufacturers of Band Saw Blades

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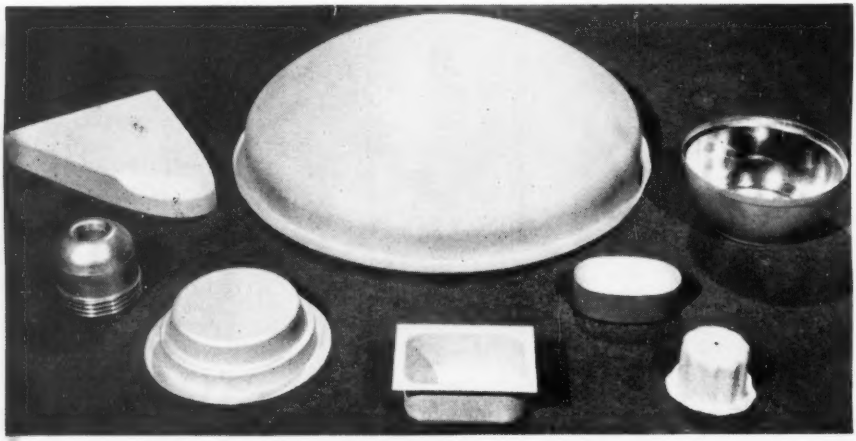
be $\frac{3}{16}$ of an inch with .025 gage aluminum and $\frac{3}{8}$ inch with .050 aluminum. Developments are under way at the present time which cause us to hope for a radical improvement in the permissible taper in one operation.

is used in conjunction with a Marform unit which has a 16 x 18 inch forming area, which provides a forming pressure of 5,560 lb. per square inch.

The 3,500 ton press is used with a 28 x 31 inch forming area which offers



An assortment of metal parts formed by the Martin Marform process. The parts shown range from 0.010 aluminum to 0.109 deep drawing steel and represent a large variety of shapes and sizes which have been successfully formed with this new metal forming method.

The current Marform equipment we are utilizing at the present time varies from one minute to another as dictated by the development progression, and by the basic press equipment available. The presses employed currently at the Martin Company are of 800 tons and 3500 tons capacity. The 800 ton press a theoretical forming pressure of 8,060 lb., per sq. inch. However, utilization of this maximum pressure increases the maintenance cost on the equipment so that this press is not used to provide more than 7,000 lb. per sq. inch. These pressures noted can be directly translated into working pres-

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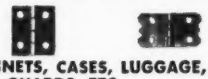

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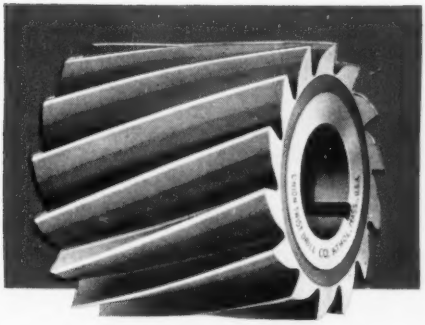

UNDERCUT TEETH with a special spiral angle give unusual efficiency to Union plain milling cutters. These teeth afford maximum strength, ample chip clearance in the fillet and permit resharpening without rapid increase in the width of land.

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If you are not already using Union tools, see your nearby Union distributor. He will be glad to work with you on any milling problem. You'll find his name in THOMAS' REGISTER on Union's insert in the "Drills, Twist" section.

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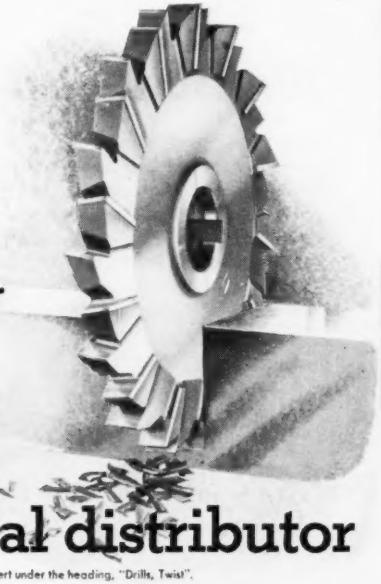
Slitting Shears	**Inserted Blade Cutters**
Side Milling Cutters	**Form Cutters**



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His name is listed in Union's THOMAS' REGISTER insert under the heading, "Drills, Twist".

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sure on the metal in the Marform unit itself.

The speed of operation of the smaller press enables us to obtain 120 cycles per hour, which may result in a multiple of that number in pieces per hour since more than one piece is often formed at one time. The large press operates at a speed of 60 cycles per hour, and this rate can also be multiplied by the addition of more parts in the same stroke. This speed of operation is based entirely upon the speed of the hydraulic press equipment on hand and can be increased to match the speed of any faster hydraulic press. No attempt has been made as yet to apply a Marform machine to a mechanical press but we have no reason to believe that such an application would be unsuccessful if the press had sufficient daylight opening and proper power.

There are many things planned for further investigation in the future such as a wider application of the process; development of allied tooling for secondary operations, which has already shown considerable promise; further investigation of the fact that the Marform machine can automatically and simultaneously shear material at any direction to the forming stroke; simplification of the equipment; and more extensive use of conservation of energy principals.

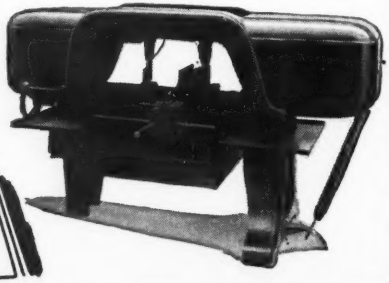
For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

As an added safety feature, all Model "J"

JOHNSON METAL CUT-OFF BAND SAWS

come equipped with a BLADE GUARD. This guard is located between the Left Frame and Guides. It covers the exposed cutting portion of the blade as a means of protection. The Guard can be readily removed to change blade. Model J (illustrated), heavy, sturdy, cuts 10" rounds, 18" flats.

Also Model B, lighter, portable, rigid. Cuts 5" rounds, 10" flats.



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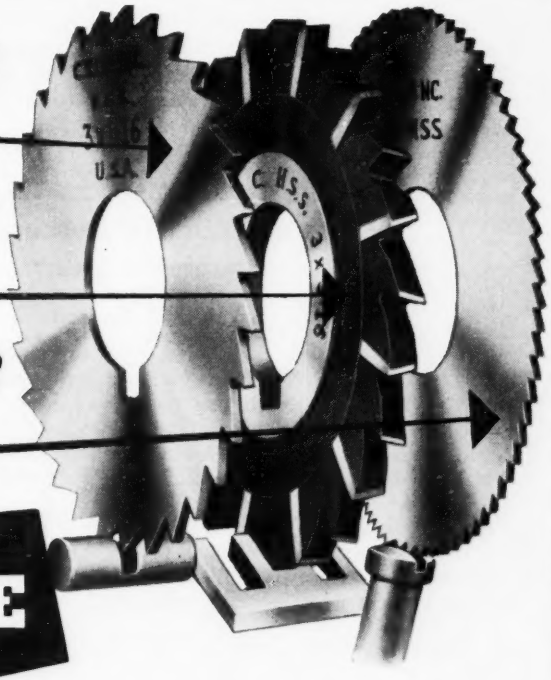
SLITTING?

SLOTTING?



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The Eyes Have It

Membership requirement in Wise Owl Clubs proves incentive to workers to wear eye protecting devices

By H. H. SLAWSON

MANY American factory workers, at long last, are beginning to take renewed interest in protecting their eyes from destruction while engaged in their daily toil. As any safety man well knows, that has not always been true and, in consequence, the toll paid for carelessness or indifference to the need for wearing eye protecting devices has, in the past, been appalling.

The change in worker attitude is being brought about primarily by making the wearing of goggles while at work a mark of distinction. Effective application of the idea has been achieved by the organization of "Wise Owl" clubs among factory workmen. Eligible for membership in the clubs are workers who were wearing goggles when something happened that might otherwise have destroyed their eyes. Symbolizing their escape from the "living death" of blindness, they display on coat lapels a pin—a small gold owl wearing goggles—which, like a Purple Heart decoration in the Armed Services proclaims their lucky status.

The hero list is getting longer every day and space is simply not available to give recognition to all the men who have won places on it. Through the kindness of the National Society for the Prevention of Blindness, however, here are just four convincing citations from application blanks for membership in the new club, made by men who can thank their lucky stars that they had their goggles on at the right moment. Things like the following are happening every day and will probably continue to happen, but the new element in this sad situation is that, where Wise Owl clubs exist, the award given the men emphasizes, as nothing else has yet succeeded in doing, that plant goggles rules are exceedingly worth while.

In a Connecticut aircraft plant a machine operator was putting on a new fixture which, to fit properly, had to be free of chips. Picking up the air hose (about 80 pounds pressure on the line) he proceeded to clean the fixture. A heavy bolt lying on the machine bed caught the air stream and was flung upward. Striking the machine's side, it glanced off with tremendous force and cracked the man's safety glasses. His eyes, however, were uninjured.

In Maryland, while aluminum plate was being sawed on a metal-cutting vertical band saw, a tooth broke from the blade, imbedded itself in the aluminum and stripped other teeth from the blade. Four of these struck one lens of the worker's prescription safety glasses making deep scratches, but did not break the lens.

Again, there was the Indiana machine shop worker who was cutting metal with a burning torch. Something

flew, striking and breaking the left lens of his goggles into several pieces. The frame, however, retained the cracked and splintered pieces and his eyes were unharmed.

In a naval shipyard in California a machinist was instructing a class of apprentices in heat treating and tempering procedures. Just as he was removing steel parallel bars from a furnace charged with perlington chemicals, the mixture exploded, due, it is believed, to a small amount of moisture in the hinges of his tongs. Hot chemicals were showered over the instructor, causing third degree burns on face, head, arms and body. But his eyes were spared by his coverall goggles.

Conception of the idea which has ushered in a new day for workers' eyes is credited to a Negro, Joe Folks, for years an employee in the chipping and grinding department of American Car & Foundry Co's. St. Louis Foundry. Early in his career a flying metal chip cracked Joe's safety glasses but his eyes were unharmed. During succeeding years he had many such "near misses" and, knowing full well that others around him were likewise veterans of many similar experiences, it was but natural for Joe to become a sort of "specialist" on the wearing of goggles. Like Cato denouncing Carthage, he never passed up an opportunity, in the shop or at his department's safety meetings, to say a word on the importance of observing the company's 100 per cent goggle rule.

Joe knew, too, that at times men were careless and took chances. This

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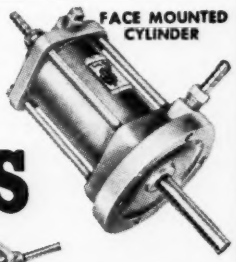
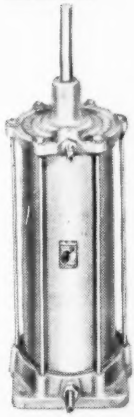
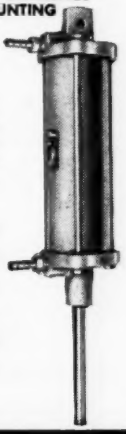


VERTICAL MOUNTING



SUSPENDED OR SWIVEL MOUNTING



Mounting	Bore				
Horizontal	1½"	2¼"	3"	4"	5"
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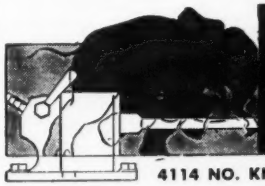

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bothered him deeply and, working at his bench, he pondered this constantly. Then, one day, his big idea came to him.

During the war he had heard about the Caterpillar Club whose members were air force men who had saved their lives by "hitting the silk" and bailing out by parachute when their planes went out of control in combat. Thereafter they were entitled to wear a small gold caterpillar pin, which looked like it was crawling up their jacket lapels.

Why not, then, Joe asked himself, form a club composed of American Car & Foundry employees who have saved an eye by wearing goggles at their moment of crisis?

"Unlike most of us," said George L. Mitsch, plant manager at the St. Louis foundry, during a talk at the National Safety Congress in Chicago last fall, "Joe did not hide his idea, but submitted it to the proper plant authorities. It took hold immediately. A survey of our various plants located 76 men still on our payroll who were eligible for charter membership. The name 'Wise Owl' club was chosen, pins and certificates designed and presented in formal ceremonies to all those entitled to them."

In the following two years the Wise Owl club membership in this company's plants grew to 180 which means that in that brief span 104 more employees had saved their eyes partly through their newly developed interest in wearing goggles.

With commendable public spirit American Car & Foundry Co. made

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Sizes 1" and larger stocked also threaded for shanks — tapered or straight — in various sizes.

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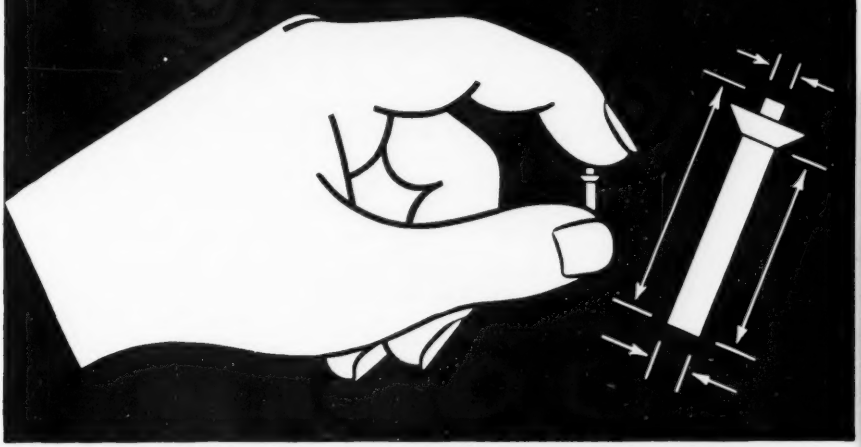

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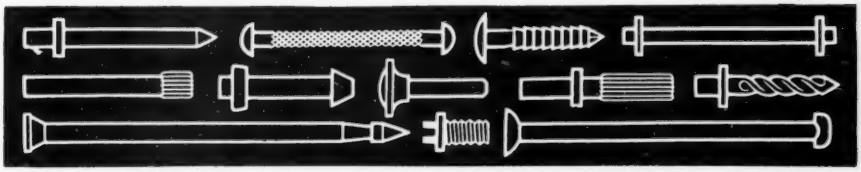

their idea available to the National Society for the Prevention of Blindness, which began promoting the plan on a nation-wide scale last year. Reporting last October on early accomplishments, the Society revealed that Wise Owl chapters had, at that time, been organized in 96 plants around the country. Total membership then was 620 and the real significance of the movement appears in the line of the report which reads: "Eyes saved in accidents recorded—650." For industrial management to think over is the further impressive statement that the saving in average compensation for those 650 "near misses" was $1,625-,000. Justifying the assertion that the plan is spreading "like wildfire," the Society further states that as of Jan. 2, 1950, clubs with 746 members had been organized in 149 plants employing 185,109 men.

The factory superintendent who can boast that in any given year not one of his employees suffered a disabling eye injury can well consider himself extremely lucky. Such shops, however are few. National Safety Council figures indicate that each year, among workers, one out of 575 suffers an accidental eye injury on the job. A national health survey covering 1935-1936 brought out that 8,000 persons had lost both eyes in occupational accidents and about 80,000 lost one eye. For 1941 the toll, according to Safety Council estimates, was 5,000 permanent disabling eye injuries and another 70,000 temporary injuries. The Council's files, too, contain a study of 237 cases of eye infection, including two which brought death to two men.

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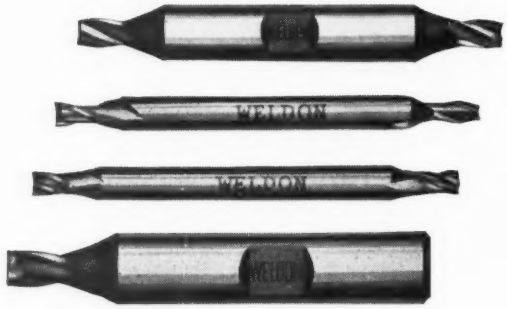

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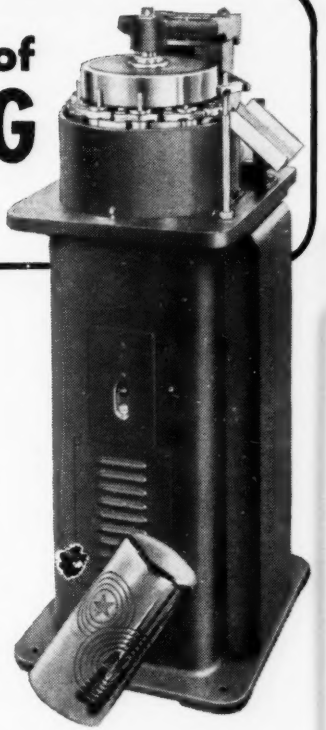
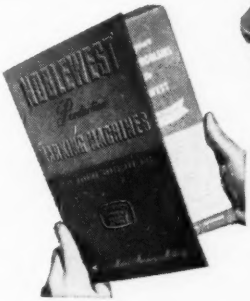


. . . but it does mark the case of the lipstick used by the young lady who left her mark. And, more important to you is the fact that this addition to the Noblewest line can be tooled for marking a large variety of products in metal, plastic, hard rubber, wood, etc. Employs the famed Noblewest roll marking process. The inscription (including the delicate decorative design) is *permanently rolled in --- lasts as long as the product itself.* You, too, can mark your products faster, better, cheaper with Noblewest Production Marking Equipment. Write Noble & Westbrook Manufacturing Co., 25 Westbrook Street, East Hartford 8, Conn.



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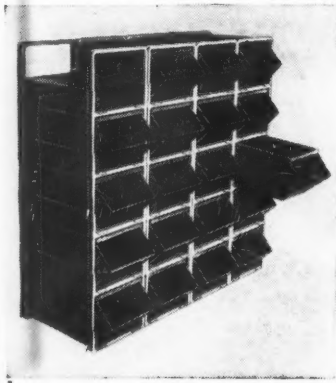
Most recent of the Council's studies covers data obtained from 730 companies, representing 24 different types of work, from which, when facts were reduced to cold figures, an average frequency rate was revealed of 0.67 disabling eye injuries per million man-hours worked.

Machine shop operations show up rather favorably on the list, with a rating of 0.77 the same rating given also to food preparation workers. It's higher than the average, but well below the worst ranking industry, mining, whose rate is 4.85. Foundry operations were second worst offenders, as to eye injuries, with a frequency rate of 3.99, while lumbering comes third with a rate of 2.35 eye injuries every time this group completes a million man-hours of work. For further comparison here are the ratings for other industrial occupations having high records of eye injuries:

Smelting, 1.69; quarrying, 1.26; petroleum, 1.24; general construction, 0.98; transportation equipment manufacturing, 0.85; heavy machinery manufacture, 0.83; production and distribution of public utilities, 0.81; food preparation, 0.77; machine shop, 0.77; chemical manufacture, 0.62.

Regarding methods of enforcing goggles rules, the Council report goes on, 58 per cent of the companies placed this responsibiltiy on their foremen; eleven per cent stated that workers who failed to wear goggles were discharged and the same proportion stated that they used other disciplinary action. One company in ten indicated that education and safety promotion was its chief means for enforcing goggles rules.

For all companies that placed enforcement responsibility on the foreman the frequency rate was 0.40. Companies using the threat of discharge had a rate of 0.45, while companies using less severe disciplinary action had



STACKBINS IN STACKRACKS

REDUCE HANDLING
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STACKBINS are individual hopper-fronted stacking bins, designed for storage, transportation and assembly of tools, parts and materials.

STACKRACKS are individual units which lock together to form racks of any size, shape or capacity. Stackbins slide like drawers in Stackracks.

Because Stackbins are portable containers – not fixtures – tools, parts and materials can be carried to departments, from machine to machine, or held in stockrooms without being transferred from one container to another. Stored in Stackracks, any Stackbin is instantly accessible when its contents are needed – without disturbing any other bin.

Manufactured and sold in Canada exclusively by Wickware-Stackbin, Ltd., Ottawa

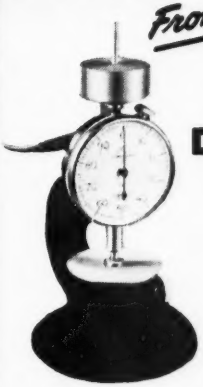
Write Stackbin Corp., 1083 Main St., Pawtucket, R. I.

STACKBIN SYSTEM

"Stacked and Still Accessible"

AMES

From Rubber Sheets to Sheet Steel



AMES DIAL THICKNESS GAUGES

give impersonal, accurate results *FASTER*

When you want to measure the thickness of either hard or resilient sheet materials you'll find one of these Ames Dial Comparators best for the job.

Ames No. 2 Dial Comparator is used for measuring non-yielding materials — sheet metal — hard rubber — glass. Compact and steady, it is ideal for bench use. The 2" dia. table is adjustable to bring pointer to zero. Fingertip lever raises contact for rapid insertion of pieces. Release lever and read dial for a truly impersonal and accurate result.

Ames No. 2W Comparator is similar to the Ames No. 2 but is fitted with a dead weight for standard measuring of resilient materials — sheet rubber — paper — plastics — etc.

Both gauges are available with dial graduations in .001", .0005", .0001" and .01 mm. Write for full details.

Representatives in principal cities. B. C. AMES CO. *29 Ames Street Waltham 54, Mass.*

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a rate of 0.65. Companies relying on safety promotion as the sole means of encouraging their men to wear goggles had a rate of 0.67. And the report concludes: "Companies that had no plan to encourage or require employees to wear goggles had rates substantially higher."

It's hard to understand, but there actually are working men who would rather not work than wear goggles. Some of their objections are valid, Mr. Mitsch of the St. Louis foundry conceded. In many cases, though, he thought it might be purely a matter of carelessness that can be corrected by a proper word of caution or discipline. However, the aversion to goggles, he added, can also be a sign that something else is wrong.

"It could mean," he said, at the Safety Congress, "that the goggles do not fit and are uncomfortable, a matter for easy correction. It could also mean that the man actually cannot see and requires prescription glasses, or that while his prescription lenses may be satisfactory for reading a chart, they are not satisfactory if, for instance, he is transferred to, say, the operation of a crane. We are told, also, that eyes change and should be checked every two years or even more frequently.

"Do our employees still have the same goggles they were given when first hired? How foolhardy to expect results from a goggles program if the man is unable to see through his goggles. No goggles program can be successful without a good followup."

Discipline, as we have seen, ranks high in reducing eye injury toll. But

Kester Fluxes

FOR SOFT SOLDER

Kester makes 64 different soldering fluxes for soft solder in salts, paste, or liquid form.

Easier to Use

Kester makes a flux for all conceivable soldering operations. Using the correct flux assures perfect results.

Top Quality

Kester fluxes are chemically pure and exactingly compounded.

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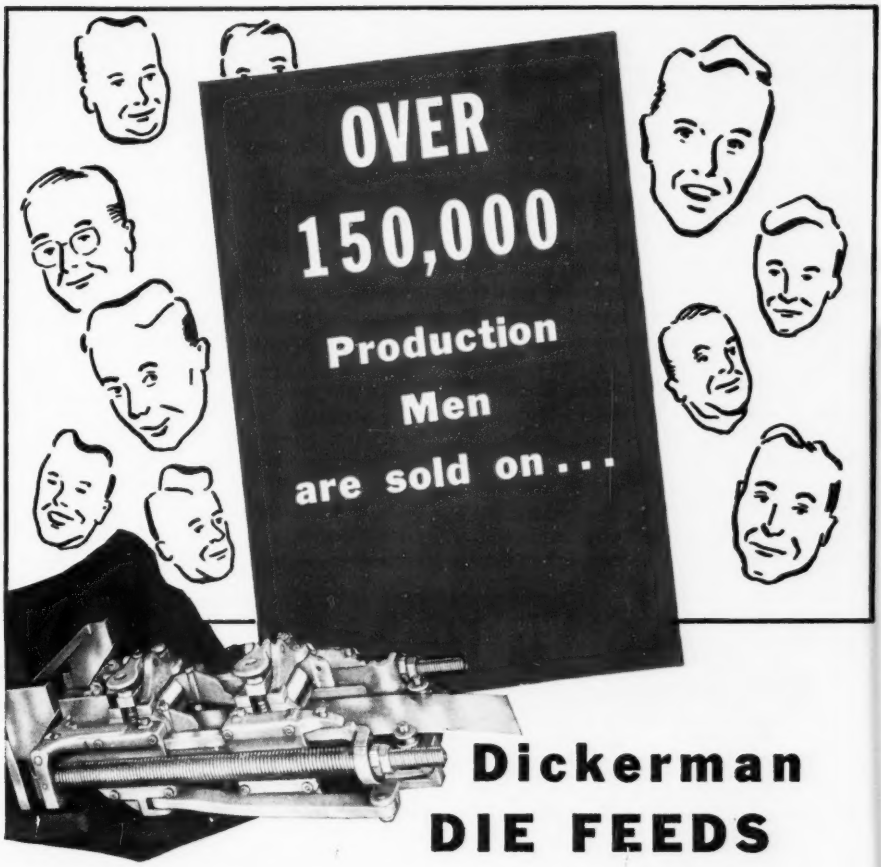

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Theirs is the responsibility of producing stampings quickly and cheaply with a minimum of delay. They are doing it successfully with DICKERMAN DIE FEEDS . . . these sturdy feeds increase production and decrease cost. Profit by their experience and install DICKERMAN DIE FEEDS on your own presses . . . they'll pay for themselves in a surprisingly short time. H. E. Dickerman Manufacturing Co., Springfield, Mass.

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Write Today for full Details

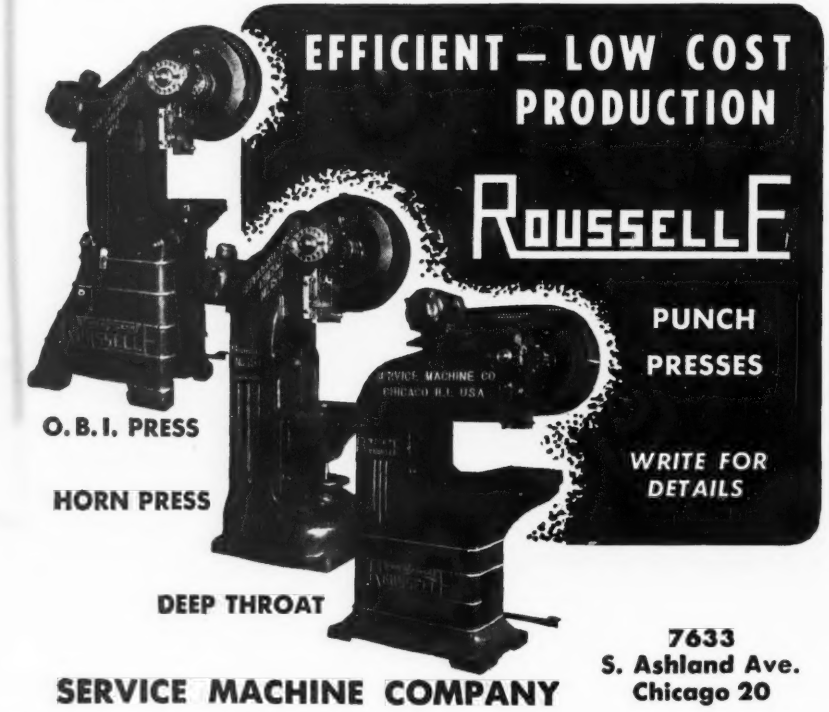
the Wise Owl clubs seem to have introduced something else. As seen by Mr. Mitsch, the success of this club movement is the result of taking safety to the employee on a strictly personal man to man basis. Couple enforcement with personal education and the results are astounding, he insists.

As one result of the American Car & Foundry Company plan for regular departmental safety meetings, attended by all employees, foremen and top management on company time, he said, every employee has become a participating member of the safety committee and every one of them is imbued with the principle of the Golden Rule and the thought that "I am my brother's keeper."

Although his company has a 100 percent goggles rule, he said, there are always men who are wilfully or thoughtlessly careless and who suffer thereby, a situation not restricted to any one industrial company.

"There's the man," he said, "who thought he could grind his tool in less time than it would take to put on his goggles; or the man who took off his goggles so that he could make a quick dash for lunch or shower room, or the man who removed his goggles because the job he was doing was hot and his glasses fogged. These are the men who must be protected from themselves and that is where our safety meetings pay off."

"In them our men are keyed up to the thought that each of us is his brother's keeper and in that spirit fellow employees in our plants instantly warn an offender of his danger. I have seen it done time and time again and never have I seen any resentment



WANT CURVES?

A PEDRICK PRODUCTION BENDER GETS THEM....

Circles, helical coils, or simple bends may be made on a Pedrick Production Bender at a very low cost. This is so because the machine is inexpensive to buy but efficient to run. Apprentice labor can produce bends equal in quality to those made by a Journeyman Machinist. All the operator has to do is to put the piece in and push a button. A jig locates the bend and a relay controls the curvature. The result is a bend like this costing about 1c.

Write for descriptive folder.

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3640 N. Lawrence Street **Philadelphia 40, Pa.**

shown. But of this I am sure, that, had the foreman seen the careless act and spoken to the employee about wearing his goggles, the reproof would not always have been received in the proper spirit."

The unfortunate fact, as Mr. Mitsch pointed out, is that, although some progress has been made in reducing hazards that cause blindness, too many men—and women—are still going home from their jobs by way of a hospital, partially or totally blind.

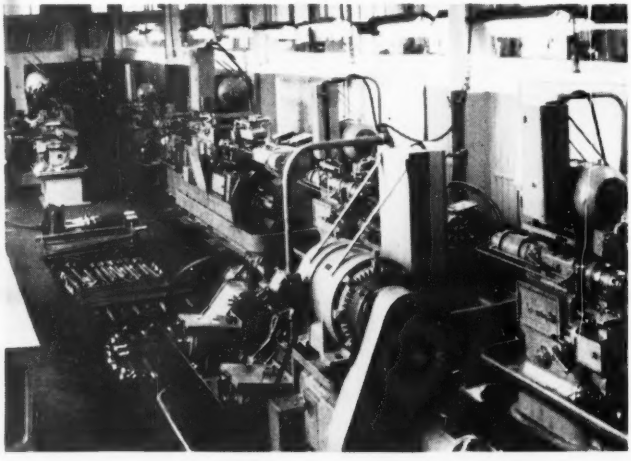
"The big question," said he, "is, what can we as safety engineers, managers and foremen, do to send them home without these hospital detours; home without a white cane, a seeing eye dog or a tin cup; home to the wife and children they left in the morning and for whom they are seeking a livelihood?"

To that question one answer seems to be this new Wise Owl scheme with its psychological influence in making men want to wear goggles. Perhaps the time is ripe to consider how the golden emblem which symbolizes the purpose of this organization, can help solve your problem of preventing "living death" from striking someone working for you.

NEARLY 500 different standard samples of chemicals, metals, ores, and ceramics are prepared, certified, and distributed by the National Bureau of Standards, Washington 25, D. C., to analytical and research laboratories for use in controlling chemical processes and in maintaining the accuracy of apparatus and equipment. The standard samples are materials which have been carefully analyzed or whose physical properties have been precisely determined at the Bureau and in other laboratories. Some are certified for chemical composition; others are certified with respect to a specific chemical or physical constant; for example, melting point, viscosity, index of refraction, heat of combustion or other properties that are important in scientific research and industrial control.

Shop Testing Before Shipment

Shown herewith is a group of Model "LR" Automatic Lo-swing Lathes undergoing rigid tests on customer's work before shipment from the Seneca Falls Machine Co., Seneca Falls, N. Y. These machines are set up and operating under conditions duplicating those in the customer's plant, a well-known Detroit automotive manufacturer. Operations involved include facing and turning the flanged end, and turning and chamfering the splined end of axle shafts simultaneously.



SANFORD

SURFACE GRINDER

IF IT FITS

Model SG

IN THE PALM OF YOUR HAND

GRIND IT ON THE

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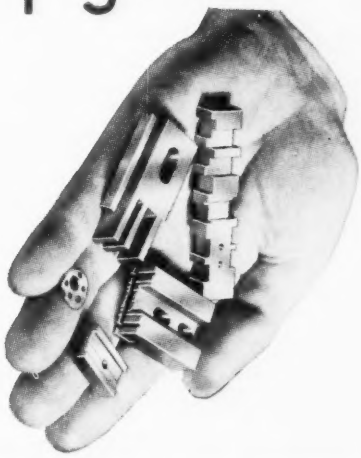

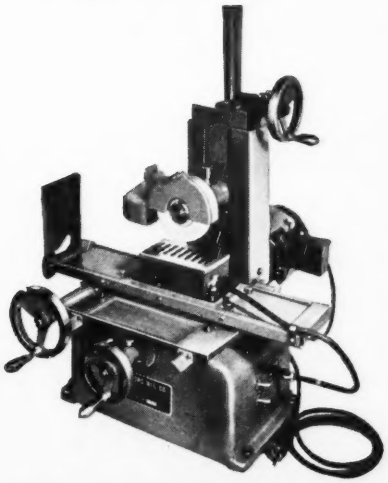

The capacity of this sensitive, highly accurate, Bench Model is 4" transverse—8" longitudinal—6" vertical under 4" Wheel. Meehanite Castings and a very sturdy construction assure long life, vibrationless operation and finishes to micro-inches.

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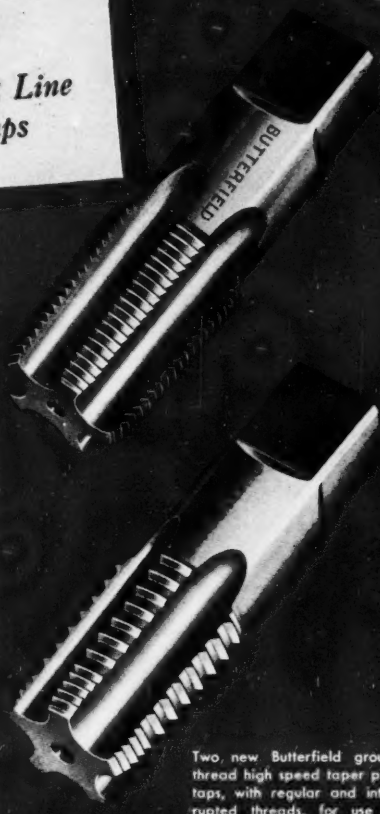
TOP PERFORMANCE IN ALL METALS

With Butterfield's COMPLETE Line of 100% Inspected Pipe Taps

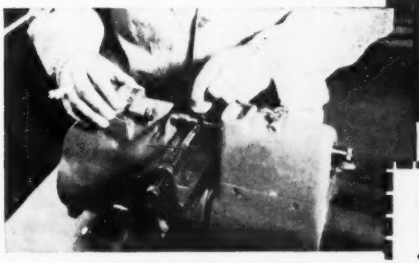
Working with some of the largest industrial users, Butterfield has achieved distinct advancements in the performance of pipe taps. Notably, in the development of a special type for steel and another for cast iron and non-ferrous metals — both of which have been thoroughly proved in actual use.

Among other Butterfield contributions in the pipe-tap field you'll find a full range of dryseal-form taps, taper and straight, with ground threads. Eliminating the annoyance of compounds, their Butterfield-engineered accuracy is your assurance of faster, easier, lower-cost sealing of joints and fittings.

Butterfield taper pipe taps are available with ground or cut threads, regular or interrupted, also regular straight, in high speed steel and with regular taper or straight threads in carbon steel — *all individually inspected* . . . See your nearby Butterfield distributor for prompt service. Union Twist Drill Company, BUTTERFIELD DIVISION, Derby Line, Vermont. *In Canada:* Rock Island, Quebec.



Two new Butterfield ground thread high speed taper pipe taps, with regular and interrupted threads, for use on steel. Both of these thread-types are also available for use on cast iron and non-ferrous metals.



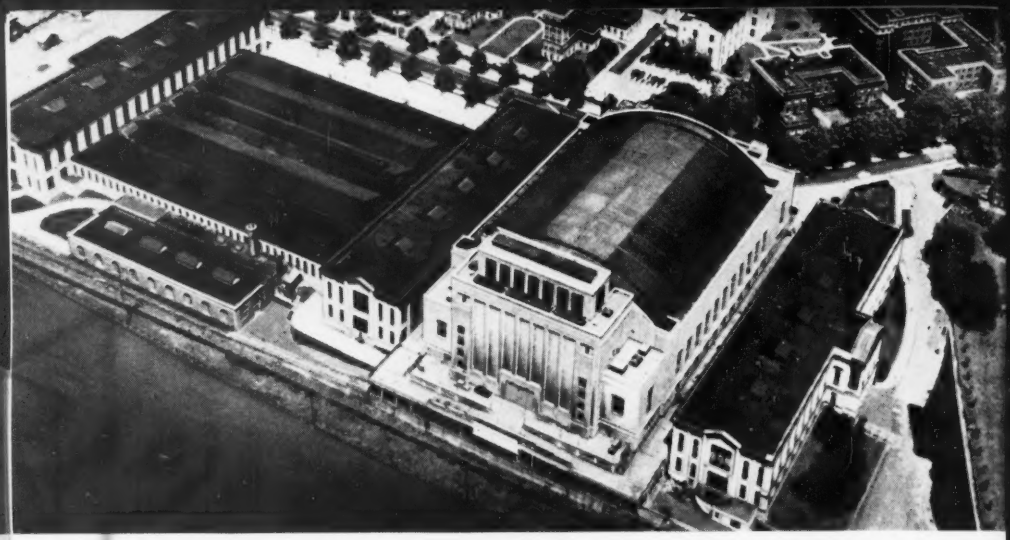
Checking pitch diameters with wires, by the pressure method. Some of the specialized equipment used in Butterfield's 100% inspection.

BUTTERFIELD

THE 100% INSPECTED TOOLS

Every Tool Individually Inspected

TAPS • DIES • REAMERS • SCREW PLATES



Philadelphia Convention Hall and Commercial Museum

Cost-Cutting Ideas Abound at ASTE Exposition

FOR anyone who is looking for ways and means of cutting his manufacturing costs, the ASTE Industrial Cost-Cutting Exposition in Philadelphia, April 10th through 14th will offer a wide variety of cost-cutting ideas. These cost-cutting ideas will be presented by more than 300 exhibitors in the Convention Hall and Commercial Museum buildings.

Among the new machine tools on display will be cost-cutting automatics and second operation chucking machines, production threaders, drilling and tapping machines, screw machines, lathes of all types, vertical and horizontal milling machines, grinders, precision boring and honing machines, and so on, both for metal working and for machining wood, plastics, and other non-metallic materials. Also, there will be many innovations in equipment associated with sheet metal fabrication with new presses, new ideas to cut die costs and time required to change dies, universal and automatic production power benders, new spot welding ideas, and similar developments.

But that is only the beginning of the

story, for the processes and equipment on exhibition—many in operation—will cover such diversified fields as grinding, both in production and in the tool room, innovations in machine controls in line with the trend toward automation, new ideas to reduce wear of machine tool parts, all kinds of new machine tool accessories designed to improve performance, and new developments in cutting tools to reduce machine down-time, reduce tool cost, and increase production.

Developments relating to the greater use of mechanical devices for materials handling will be shown. Heat-treating will be represented with improved furnaces. Several new basic materials will be introduced. Finally, the job of reducing assembly time by greater production accuracy will be reflected in the many new types of inspection and checking methods and equipment on display. Among the numerous interesting developments which will be on display are the following.

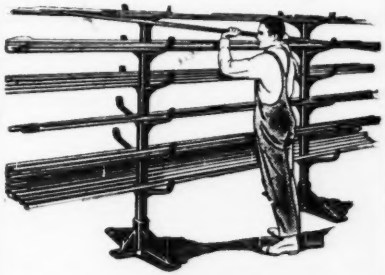
Machine Tools

Aside from the more conventional types of machines on display will be a new multiple spindle drill press on which up to five spindles can be used in any position from a little over 3 inches to over 7½ inches apart. The spindles on this drill press are accurately positioned for each job by the use of templates. Jig-borers with infinitely variable speeds—from 90 to 2 00 r.p.m., and thread rollers that will handle bars up to 4 inches diameter and threads up to 8 pitch will be displayed.

A device will be shown which reduces the number of machining setups required, makes possible milling or

HOW YOU CAN BOOST YOUR PROFITS

The BROWN TIME-SAVING RACK saves the time previously lost end-hauling each bar of stock its entire length from the old-style, closed-side Rack, the Brown Rack requiring but a few inches of side movement. Each length, width and thickness of stock is displayed in gold-fish visibility for instant selection. Workmen waiting for stock are served without waste of time, and returned to their production machines to turn out a maximum of output.



Any time you require additional storage space, all you need do is to add more units. If you want to relocate it at any time, you can do so quickly for it is unattached to the building. It is a simple, durable article made of metal in five styles. It can't burn, warp, sag or twist: depreciation is practically nil. SEND FOR BULLETIN No. 26-P DESCRIBING THE BROWN TIME-SAVING RACK.

BROWN ENGINEERING CO.

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grinding on lathes, boring and drilling on milling machines, and so on, without removing the work. Thus a part can be turned, faced, milled, ground, bored and drilled in just one setup on one machine such as a turret lathe.

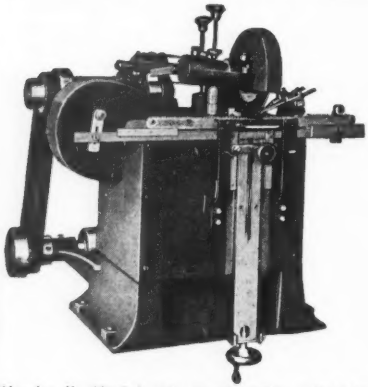
Automatic band machining of metals, wood, plastics, and so forth, is provided on an all hydraulic machine with remote control. There is a drilling machine for small holes which consists essentially of a high speed motor and rotary air compressor on the same armature shaft; operates either completely or semi-automatically.

Grinding

With harder and tougher materials coming into use, calling for ever harder tool materials, grinders will be shown which are designed to precision finish such materials as sapphires and norbide. Accuracy of the machines is indicated by spindle tolerances—half a hundred-thousandth of an inch for roundness.

A tool grinder that may be used as (1) a surface grinder, (2) a chip breaker grinder or (3) a universal tool and cutter grinder will be introduced. This grinder is said to be particularly useful for carbide tool grinding. The motor on the grinder is designed for reversal up to 70 times a minute. New grinders with two wheels, one alongside the other so that rough and finish grinding can be performed without the operator having to move from one machine to another or from one side of the machine to another, will be on display.

Among the grinders and grinding equipment which will be exhibited will be precision grinders of the type formerly imported from Switzerland, tap



Wardwell Model EC Combination Grinder The only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. • This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

sharpening 1 gross of hack saw blades PAYS for this machine!

One gross of hack saw blades can be resharpened at least 6 times—actually saving you the price of the machine!

Wardwell EC Grinder gives old blades a keener, longer lasting cutting edge—because new blades are usually not ground after hardening.

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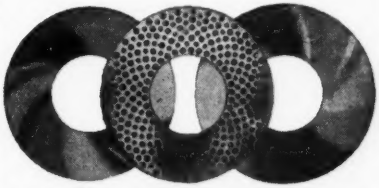

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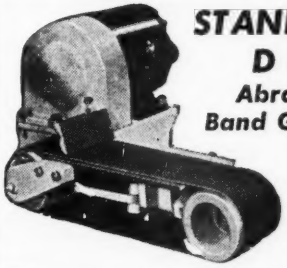

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Famous for Stamina

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36¼" band. The ideal portable unit.

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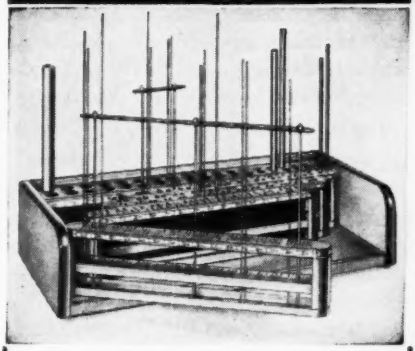

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grinders which are said to increase tap life between grinds and reduce scrap, new type of abrasive discs which are said to give faster and more sustained cutting, profile grinders in which a master part is used to guide the wheel dresser, magnetic chip separators which can be installed on any grinder without alteration, unusual grinding fixtures—one graduated in degrees in all planes that will automatically index up to 180 degrees, new types of resinoid wheels, new diamond content abrasives, new developments in wet and dry belt grinding and centerless polishing equipment.

Metal Forming

As a step toward the elimination of productive time lost in die changes, magnetic perforating dies will be shown which can be reset in a fraction of the usual time. The perforating tools are located by simple templates for each job and magnetically locked in place. For two parts, each calling for 25 holes, die change time is about 20 minutes. Die storage and cost is also reduced.

To reduce forming die costs for applications where runs are short a new process will be shown by means of which one section of the panel can be formed or drawn at a time, and the sheet then rotated to form and draw a second section, and so on. Another development intended to reduce die costs is a new sheet steel and plate cutting machine designed to handle from 14 gauge to 11/32 inch mild steel. By means of this machine, a variety of shapes can be quickly cut.

Standard die sets in which posts and bushings were put in "Deep-Freeze" prior to assembly to relieve

The Inside Story!

"TANGENTIAL FIRING"

The DELAWARE CONTROLLED ATMOSPHERE FURNACE

Features a unique tangential firing principle. This method of heating assures:

1. Maximum uniformity of temperature in all parts of the muffle.
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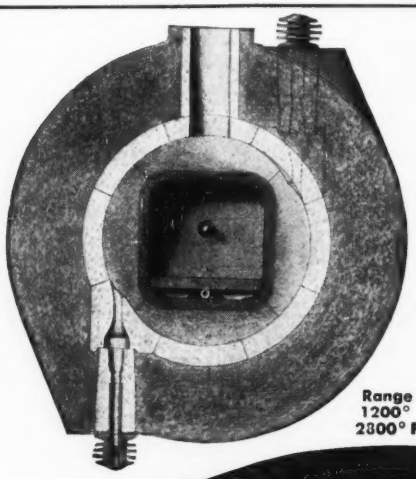

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Each thickness a distinctive, easy to identify color. Impervious to oil. Long lasting. 5"x20" sheets. Special sizes to order. Handy assortment, shim stock, 12 colors—12 thicknesses (.001-.030). Bound together. $4.25.

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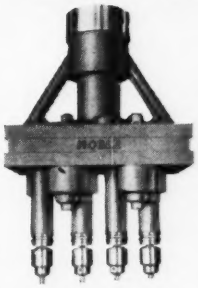
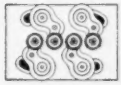
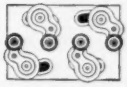
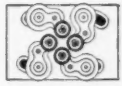
MULTIPLE SPINDLE DRILL HEADS



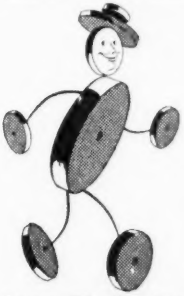




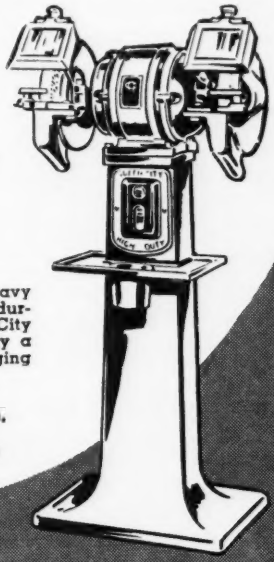


Adjustable to straight line and radial patterns.
Fixed Heads to Specifications.
Literature on Request.

NOBLE MACHINE TOOL CO.
222 EAST ST. PAWTUCKET, R. I.



Cut grinding costs . . . with rugged QUEEN CITY Grinders



Queen City Grinders are built to stand up under the heavy work that pours through the shop daily. Noted for their durability, freedom from downtime and low cost, Queen City Grinders cut grinding costs to the bone. • Order today a battery of these low cost grinders and eliminate "ganging up" around one lone grinder.

QUEEN CITY
Machine Tool Co.
223 E. 2nd St.
Cincinnati 2, Ohio

QUEEN CITY MACHINE TOOL CO

any strain will be on display. Also on display will be fully automatic tube and pipe bending machines with push button controls, new presses with automatic high speed stock feeds, 100 ton presses with 10,000 p.s.i. working pressure, dial assembly presses designed for use with hopper feeds to cut loading time and increase output, universal and automatic power benders, perforating, piercing and notching equipment for all kinds of parts including television panels, ring punches and dies which are said to eliminate jamming, and longer-life punches, dies and die-sets.

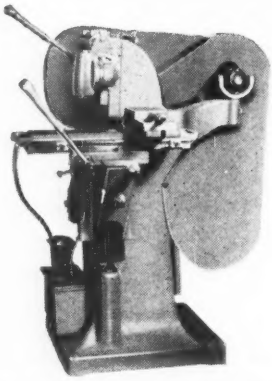
Resistance Welding

Offered as a solution to one of the difficulties of resistance welding—the need for frequent dressings of the many electrodes on multiple welding machines—is an air operated electrode dresser which is said to cut dressing time materially. Other resistance welding developments include new hydraulic pressure boosters and a spot welder with a new electronic weld timer having precision weld control, pneumatic control of off-time. Latest brazing methods will also be shown.

Machine Controls

The old-fashioned cylindrical phonograph record will make its reappearance in modern form to serve as a means of controlling machine operations by a combination of electro-mechanical impulses.

With the need for more automation, standardized linkage ends to permit lower cost interconnecting of speed change mechanisms, and so on, and new machine controls such as valves, pumps, fluid motors, and so on, which make machine servicing faster and re-



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has proved itself the number one value in medium size, all purpose hand milling machines. New universal attachment doubles its scope. Send for information.

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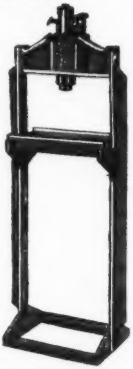
$84.00



FIVE TONS of smooth power is at your service with this compact and versatile tool.
The perfect press for garage, electric motor shop, refrigerator repair and machine shop.
Will operate lying horizontal.
Ram has removable anvil and retracts itself when released. Weight 100 lbs. Stroke 5½". Height 53". Width inside 16".

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Immediate Delivery
FROM STOCK
GREAVES-SILENT BAKELITE GEARS

No waiting when you order Greaves Silent Bakelite Gears. • We have them in stock NOW! • Your order will go forward immediately. • You'll appreciate the silent operation and added smoothness provided by Greaves Silent Bakelite Gears. • You'll marvel at their great strength to carry big power loads . . . their remarkable ability to successfully operate completely submerged in water. • You'll welcome their low cost. • No metal reinforcements required. • Save Time . . . Money . . . Labor!

We also make silent gears of rawhide and Fabroil.

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FOR ORDERERS CUTTING THEIR OWN GEARS, WE CAN MAKE IMMEDIATE DELIVERY ON BLANKS SAWED TO SPECIFIED DIAMETER AND FACE

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Cincinnati, Ohio

BUILT RIGHT! PRICED RIGHT!

Simple in design. Easy to operate. Rigid construction including every worthwhile modern feature of milling machine development. With 18 spindle speeds (20 to 1000 R.P.M.) both the universal and plain millers are readily adaptable for heavy duty or light precision production work. Send for bulletin.

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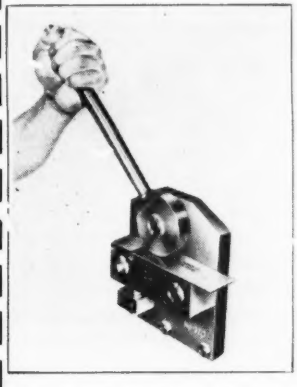
ACROMARK POWER MARKING MACHINES

(SERIES 9A—POWER DRIVEN)

Are the last word for high production, high precision marking. A powerful gear reduction motor does the driving. Clutch operated. Fast, smooth and quiet.

MODEL 9AMP—MOTOR DRIVEN, PEDESTAL MODEL SHOWN→



HAND MARKING MACHINES No. 920

Shown at left are frictionless. A double row SKF precision ball bearing carries the plate or part as it passes under the roller die.

Write for Latest Color Folder

The ACROMARK *Company*
9 MORRELL ST., ELIZABETH 4, N. J.
"THE ORIGINAL MARKING SPECIALISTS"

NUMBERALL

CUTS THE COST OF STAMPING NUMBERS

DETAIL CHASE and PUNCH

NEW NUMBERALL

for stamping name plates, checks, tags, etc.

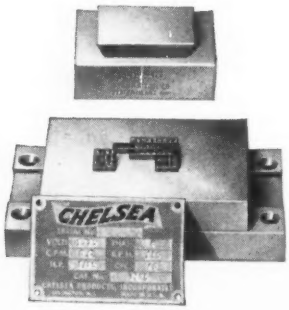
For rapid stamping of plain, etched or embossed name plates. Used in a small Kick or Power Press or in our No. 93 Bench Press. Plate to be marked is laid face down on gauge. Flat punch fitted in ram of press makes the impression.

Recesses in the chase register with blank spaces on name plate. Steel Type and Logo Type are dropped into the recess and, as not fastened, changes can be made quickly.

Logo type are used for numerical and letter combinations such as 110, 220, 1250 and AC, DC, etc.

All lines stamped in one operation. Small as well as large lots stamped economically, neatly.

Bulletin 522-MS on request.



Model 24

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

duce machine idle time will be exhibited.

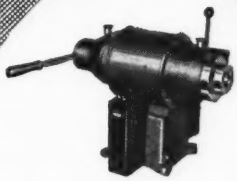
Remote control timing devices to convey and classify almost anything manufactured and do it automatically, chuck operating ring type air cylinders that provide greater force through cams, new surge damping valves, pumps, and so on, automatic indexing mechanisms for milling machines, pneumatic relays for automatic machinery operating on movements as little as two millionths of an inch, and new automatic fixture locks are among the machine control devices that will be on display.

Machine Accessories

Closely allied to machine controls in insuring maximum machine efficiency are the various machine accessories. Here will be found collets with a greater range of adjustment through the use of rubber so that fewer collets are needed to handle a wide range of stock, expanding mandrels that will hold tolerances to less than 0.0001 inch, air cylinders that use a diaphragm instead of pistons, diaphragm operated expanding arbors, and new drill press vises that are free to swing in any direction from the column and may be securely locked in any position.

Also on display will be new cost-cutting magnetic work-holding fixtures for milling machines and other machine types, and lathe chucks with flame-hardened jaws for longer life and greater service accuracy.

There will be a device on display which can be used to convert an ordinary lathe in a matter of minutes into a precision turning machine capable of handling parts of extreme slenderness and finishing to an almost ground surface condition, devices which permit



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Small Metal and Plastic Parts Better, Speedier, at Low Cost

For the type and size designed to meet your particular needs

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Schauer Manufacturing Corp.

Originators of Today's Speed Lathes

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MARK IRON, STEEL and CARBIDES

THE Etchgraph WAY

Original Electric Etcher. Thousands in Daily Use

Mark *hardened parts*, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainly. • Three sizes to meet all requirements.

• *Write for circulars and prices.*

BREWSTER-SQUIRES CO.

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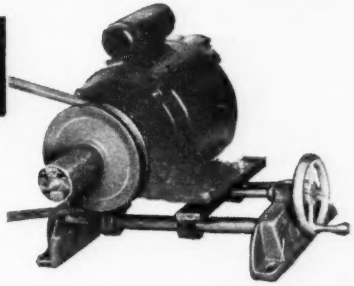
Fast Speed--Slow Speed any speed-and instantly

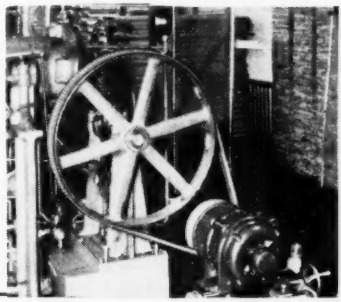
No stopping—no belt changing, with

LOVEJOY
Variable Speed
PULLEYS



Easily installed with old or new equipment.

Infinitely variable control as type of work, temperature, speedability, or production schedule require. Duties from fractional to 8 h.p. Ratios to 3:1. Compact. Accurate. Durable. Low cost. Deliveries from stock. Write for illustrated catalog showing scores of uses. Also wide V-belts, sheaves, and adjustable motor bases.



LOVEJOY FLEXIBLE COUPLING CO.

5007 W. Lake St. **Chicago 44, Ill.**

Mfrs. Lovejoy Flexible Couplings and Lovejoy Universal Joints

the milling of cams without previous layout, pilot valves, air compressors, combined filter-regulators, tapping heads with new features, and new types of clamps and mounting bolts.

Machine Tool Parts

Among machine tool accessories might also be classified such items to be on exhibit as hydraulic fittings that will stand all kinds of vibration without failing. These should help keep automatic machines operating more continuously. Then there will be live centers for machines handling parts as heavy as a 100-ton turbine shaft, new type dividing heads for milling machines with novel features (one of them works optically), and so on.

Cutting Tools

A great amount of attention will be directed to cutting tools since it is the cutting tool which determines the effectiveness of almost any machine in operation. Of particular interest in this connection will be the major stress on carbide tools at this Exposition. Among the newer types of carbide tools will be several carbide milling cutters with blades which can be sharpened without removing them from the body, the blades being interchangeable over a wide range of cutter sizes, thus reducing tool cost as well as grinding time. Carbide milling cutters which permit use of solid carbide inserted blades in cutters of only 1-inch diameter will be shown.

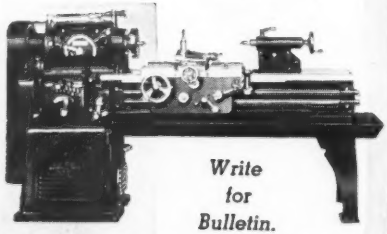
New shell-type carbide expansion reamers which compensate for tool wear with uniform expansion to 0.0001 inch, and new tool holders designed to take greater advantage of carbides and reduce tool-change time will be shown. Counterbore cutters which cannot freeze in the holders but

CARROLL AND JAMIESON LATHES

16"

12 Speed Geared Head Motor Drive Timken Mounted Spindle.

Modern Design—Liberal Dimensions.



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THE CARROLL & JAMIESON MACHINE TOOL CO.

BATAVIA • OHIO, U.S.A.

GRANT RIVETERS

• Pioneers in the riveting field. Head rivets from smallest to ¾" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. *Write for literature—and don't forget to send samples.*

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Latest and Newest Development
Improvement of Design

- Dial Snap Gages
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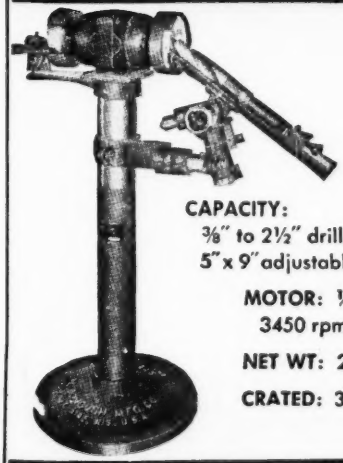
- Internal Groove Gages
- Complete Line of AGD Standard Gages

Get descriptive literature

NILSSON GAGE CO., INC.

Poughkeepsie • New York

STERLING DRILL GRINDER



CAPACITY:
3/8" to 2½" drills.
5" x 9" adjustable table.

MOTOR: ½ hp, 3450 rpm.

NET WT: 250 lbs.

CRATED: 320 lbs.

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EAU CLAIRE, WISCONSIN, U. S. A.

SAVINGS UP TO 50%

THROUGH INCREASED LATHE AND MAN-HOUR OUTPUT

IDEAL LIVE CENTERS

For Light or Heavy Turning

Users report savings up to 50% with quality and accuracy of work markedly improved. Spoilage and overheating both eliminated. IDEAL Live Centers are permanently accurate due to special bearing seal, short overhang and unique bearing arrangement that gives maximum rigidity. Available in all standard sizes. "Multi-Duty" for male, female and pipe-type points. "Heavy-Duty" for big jobs — accurate to .0005".

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can be removed at any time without tools, and new developments said to revolutionize drilling of holes in masonry materials will be on display.

A new "universal" carbide tool with serrated tip which may be used and adjusted for turning, boring or facing and to compensate for wear will be shown, in addition to industrial diamonds and carbide twist drills as small as 3/32 inch diameter.

Control systems which permit cost reductions in manufacturing by using the cutting tool as the control point have been developed and will be displayed. Methods of tool salvaging and equipment for this purpose will also be displayed. A device which makes possible the precision setting of tools in boring bars and thus eliminates need for trial and error cuts in setup will be shown.

How would you tool up—*to machine 59 different parts in short runs?*

Warner & Swasey Company—on parts for its textile machines—did it very simply. The tooling consists essentially of

ONE Colonial Pull-down broaching machine, plus

THREE base fixtures, plus fixture adapters . . .

. . . all designed and built by Colonial Broach Company, Detroit. Net result:

High precision, fast metal removal, reasonable tooling cost, low change-over cost. For the complete story, ask for Broaching News, Vol. XI, No. 2.

Checking Equipment

Of interest will be the non-metallic materials which are designed to improve checking operations, particularly in the metal-working industry. Included will be surface plates made of non-corrosive, non-magnetic ceramic materials. These are said to reduce wear, increase bluing speed and reduce wear on gages.

Among the new devices designed to reduce inspection time and cost while insuring greater interchangeability at the assembly line will be light-wave micrometers which will meas-

FLYNN OFFSET BORING HEADS

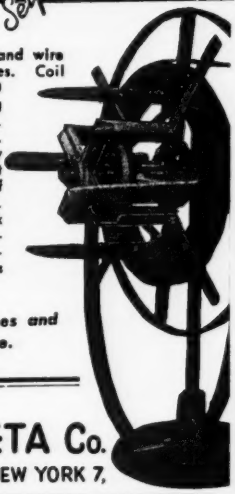
- Micrometer offset screw ground from solid.
- Large, easy to read dial graduated in .001"
- Tool block hardened, ground and fitted to body.
- "V" tool block holds any size bar rigid.
- Interchangeable shanks and arbors.

USED FOR 30 YEARS IN TOOL ROOMS AND PRODUCTION SHOPS FOR PRECISION BORING

Head No.	Body Dia.	Maximum Bar Capacity	Micro Offset	Price
6	1⅞"	⅜"	½"	$ 22.
8	3¼"	⅝"	½"	30.
10	4"	⅝"	½"	70.
12	4"	¾"	1"	45.
20	7½"	1½"	1"	125.
30	4"	¾"	1¼"	70.
32	5⅛"	1"	2"	115.
35	4¾"	⅝"	1½"	85.
36	6⅜"	1¼"	2"	150.

FLYNN MANUFACTURING CO.
437 BATES STREET • DETROIT 26 MICHIGAN

WESTLEN Adjustable Self Centering REELS



For feeding strip and wire coil stock to presses. Coil capacity 300 to 500 lbs. Outside ring dia., 28" to 36". Height of reel, 36". Wheel automatically adjusts parts to suit inside diameter of coils from 11" to 20". Arm allows for quick conversion to horizontal or vertical position and adjusts height of reel.

Write for prices and literature.

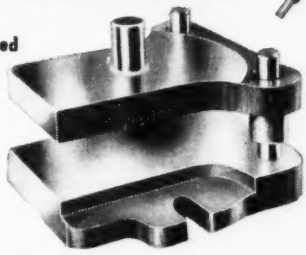
The RULETA Co.
27 WARREN ST. NEW YORK 7,

PLAY SAFE with GUIDE POSTS!

Use CMD ***Anti-Scoring LUBRICANT***

—The SURE way to prevent ruined equipment and costly delays!

Non-corrosive and highly concentrated to withstand pressures greater than 50,000 lbs. per square inch, CMD lubricant gives your guide posts the best anti-scoring protection available. Safe. Economical. Prevents *all* metal-to-metal contact. Stays "put"—protects longer, reducing wear on moving parts.



Available as oil or grease. Packed in 4 oz. tubes, 1 and 5 gallon cans, and 55 gallon drums.

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CHICAGO MANUFACTURING & DISTRIBUTING CO.
1928 WEST 46th STREET CHICAGO 9, ILLINOIS

ure to 1/100,000th inch, the latest in surface measuring equipment, stereoscopic microscopes, electronic sorting and gaging equipment, and gage blocks designed and made of materials not susceptible to body heat.

On display will be a new dynamic balancing machine using photoelectric controls, which also records the time required to "check" and the idle time of the machine, gear speeders designed for air-clamping for faster checking, and optical comparators—contour projectors to cut tool room costs.

An electronic-comparator accurate to a millionth of an inch, and a pocket comparator which will measure accurately all kinds of angles, lengths, circles, radii, and so on, in both tool room and production checking will be shown.

An inspection device which automatically combines the various types of errors which may occur in screw threads and gives a composite answer as to how well that screw thread will fit and eliminates individual checking will be shown.

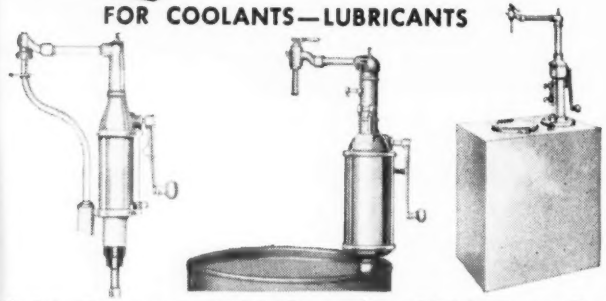
There will also be devices designed to convert snap gages to dial instruments at a cost far below that of the usual dial snap gage, hydraulic marking machines adjustable from 0 to 12,000 pounds pressure, and dial snap gages designed to check external and internal splines and gears faster for pitch diameter. Electric typewriters for marking metal parts will be exhibited.

HERE'S LOWEST COST WAY TO HANDLE SHOP LIQUIDS

PHILLIPS Quart and Gallon Stroke BARREL PUMPS

Phillips single stroke, hand operated Barrel Pumps are available individually or as complete Phillips Tank Units—Can be plated to withstand corrosive liquids. Save time—prevent waste with low-cost, dependable Phillips Barrel Pumps.

FOR COOLANTS—LUBRICANTS



Model 19 — quart stroke, swing return drain. Adjustable intake. Threaded for 1½ and 2" openings.

Model 174 — gallon stroke, quantity stops, adjustable suction. Threaded for 1½ and 2" drum openings.

Model 81 — gallon stroke pump on 65 gallon tank — ideal for battery installation. Can be supplied with casters or dolly. Other sizes are available.

Write for prices and FREE Catalog—today!

DEPENDABLE PHILLIPS SERVICE STATION EQUIPMENT

PHILLIPS PUMP & TANK CO.
5050 Brotherton Rd. Cincinnati 9, Ohio

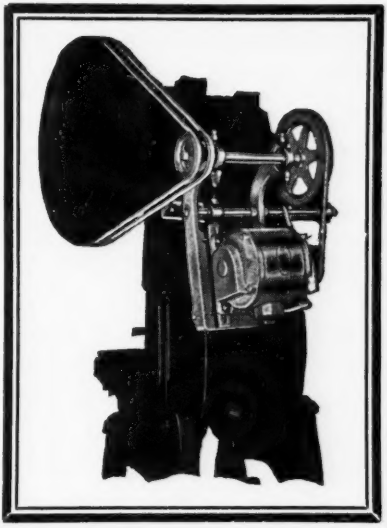
Model PE-1

2 & 3 dimensional models

Variable Ratio Pantographs, Pantograph Controlled, Profiling Vertical Millers.

For Contour Milling, Profiling, Intricate Cams, Calibrating, Die and Mold making. Engraves on curved surfaces without special templates, with smooth lines in any design, number, letter; on iron, brass, copper, aluminum, soft steels and all plastics • Drills a series of holes • Increases accuracy and production • Etches glass and similar items • For information and prices write Dept. M.

AUTO ENGRAVER CO.
Florida Hill Rd., Ridgefield, Conn.



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Motor Drive
Puts the "PUNCH" in Punch Presses

No need to use slow speed or geared motors and small pulleys to slow down your presses.

Utilize standard 1750 RPM motors.

"V" Belt Drive absorbs shock — operate smoothly — silently — efficiently — economically.

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THE NICHOLS ENGINEERING CO.
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ALL THE DATA YOU NEED...

on DRILL JIG BUSHINGS

...at the flip of a single page

Make drill jig designing easier with this "Flip-a-page" catalog.
Free on Request

COLONIAL BUSHINGS INC.
P.O. BOX 37, HARPER STATION
DETROIT 13, MICHIGAN

Materials Handling

Aside from the materials handling labor-saving developments mentioned above there will be several other developments of interest at the Show, including a punch press feeding device designed to transfer parts from a nesting plate into the punch press die by means of mechanical and vacuum operation. Parts are also automatically ejected by means of a trip action interlocked with the feeder.

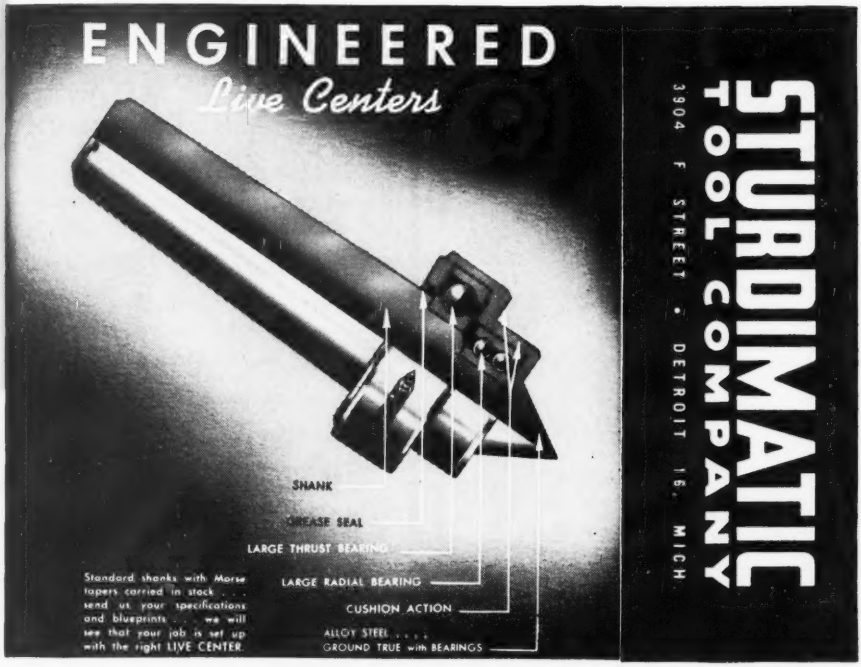
With wider use of automatic conveying and handling equipment there will be interest in the newest positive action lubricant pumps and automatic conveyor lubricators designed to service such equipment. Variable speed drives and power arm positioning devices will also be on display.

A feed mechanism for presses has been worked out so that a stamping press can turn out as many as 50,000 pieces per hour (14 pieces per second). It is designed for presses from 4 to 8 tons capacity. New automatic feed mechanisms for screw machines and lathes will be shown.

New Metals and Heat-Treating

In addition to the uses of nonmetallics, mentioned above, there will be shown a new type of free machining steel, introduced nationally for the first time. Hardenability is said to be the same as AISI 4150.

Porous, self-lubricating stainless steels for machine bearings, and so on, a new type of high speed steel for cutting tools and dies and solid titanium for gages are among other interesting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developments which will be on display.

New types of controlled atmosphere furnaces handling up to 2800 deg. F. are said to provide uniformity of temperature with greater simplicity. Salt bath furnaces provided with automatic materials handling equipment are also being shown.

Miscellaneous

A considerable amount of work has been done recently in the development of more effective machine lubricants, coolants, and cutting oils. As a result, most of the major oil companies have something to talk about at the Exposition.

For those interested in the items which cut non-productive labor, there might also be mentioned tracing file drawers which are provided with mechanical devices to lift tracings at any point so that it is possible to remove the bottom tracing as easily as the top one. Drawing tables on which the height or angle can be instantaneously altered for convenience of the draftsmen by means of a foot pedal will be on display. Also revealed is a process to make "blue prints" or rather "white prints" directly from tools, templates, and so on, without requiring the preparation of drawings.

There is even an assembly hammer which will be on display which—it is claimed—can be used to strike a sharp blow without bouncing back.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

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Acme Tool Company	766
Acme Winter Corporation	765
Adel Precision Products Corp.	1040
Airborne Accessories	1122
Air-Speed Tool Company	728
Ajax Electric Co., Inc.	434
Allegheny Ludlum Steel Corp.	618
The Allen Mfg. Co.	524
Allied Products Corp.	665
Allison Company	205
Alpha Corp.	718
American Machine & Foundry Co., Wahlstrom Tool Division	659
American Machinist McGraw-Hill Publishing Co., Inc.	416
American Pullmax Co., Inc.	958
American Society of Tool Engineers	888
B. C. Ames Company	710
Ampco Metal, Inc.	1131
Amplex Mfg. Co., Div. Chrysler Corp.	1107
Anderson & Sons, Inc.	329
F. E. Anderson Oil Co.	422
R. B. Annis Company	1056
Anton Machine Works	17
The Apex Tool & Cutter Co., Inc.	5
Armstrong-Blum Mfg. Co.	521
Armstrong Bros. Tool Co.	1047
The Aro Equipment Corp.	741
E. C. Atkins & Co.	654
Atlas Press Company	1008
Austenal Laboratories, Inc.	520
Automotive Industries, Chilton Publishing Company	408

Company	Booth
B	
W. O. Barnes Co., Inc.	339
Bausch & Lomb Optical Co.	407
Bay State Abrasive Products Co.	966
Beaver Tool & Engineering Corp.	433
The Bellows Company	802
Bemis & Call Co.	1054
Bendix-Westinghouse, Automotive Air Brake Company	333
Benzon Machine Company	658
Black Drill Co.	724
Edward Blake Company	919
Henry P. Boggis & Co.	401
Boice-Crane Company	1139
Bokum Tool Co., Inc.	1049
Boyar-Schultz Corp.	133
Bridgeport Machines, Inc.	1031
The Brinnell Co.	567
Brown & Sharpe Mfg. Co.	849
Charles Bruning Co., Inc.	801
Brush Development Company	33
Bryant Chucking Grinder Co.	3
C	
Cadillac Gage Company	924
Cadillac Stamp Company	753
Campbell Machine Division, American Chain & Cable Co., Inc.	226
Carboloy Company, Inc.	736
The Carborundum Company	1101
Chicago Rivet & Machine Co.	1123
Chrome Electro-Forming Co.	955
Circular Tool Co., Inc.	225
Cities Service Oil Company	636
Cleveland Industrial Tool Corp.	15
Clinton Machine Co.	1057
Colonial Broach Company	1021
Commander Mfg. Co.	426

Company	Booth
Conover Mast Publications, Inc.	308
Cox Engineering & Sales Co.	203
Arthur A. Crafts Co., Inc.	229
C. C. Craley Mfg. Co.	1149
F. M. Crayton	546
Crystal Lake Grinders	740
The Cushman Chuck Co.	866
Cycloid Corporation	23
D	
Dake Engine Company	1014
Danly Machine Specialties, Inc.	850
DCMT Sales Corporation	412
O. F. DeCastro & Associates	1058
Delaware Tool Steel Corporation	429
Denison Engineering Co.	1032
Detroit Broach Co., Inc.	505
Detroit Power Screwdriver Co.	939
Detroit Stamping Company, Finished Products Division	321
H. E. Dickerman Mfg. Co.	771
Eugene Dietzgen Co., Inc.	865
The DoAll Company	121
Donovan Company	1
D-S Grinder Division, Royal Oak Tool & Machine Co.	517
The Dumore Company	959
E	
Eastman Kodak Company	816
Edgcomb Steel Company	618
Elgin National Watch Company, Industrial Products Division	306
Enco Manufacturing Co.	303
Engineers Specialties Division, Universal Engraving & Colorplate Co., Inc.	129
Engis Equipment Co.	915
Erickson Tools Division, Erickson Steel Company	240
Errington Mechanical Laboratories, Inc.	554
Ettco Tool Co., Inc.	732
Everede Tool Company	311
Ex-Cell-O Corporation	440
F	
Falcon Tool Co.	560
Federal Products Corp.	305
Ferguson Machine & Tool Co., Inc.	651
Fidelity Tool Supply	1143
Firth Sterling Steel & Carbide Corp.	1024
FloatLock Corp.	4
Flodar Corporation	203
Foster Mfg. Co.	642
The Frick-Gallagher Mfg. Co.	631
G	
The Gairing Tool Co.	936
The Gammons-Hoaglund Co.	31
Gardner Publications, Inc.	1111
Gerotor May Corporation	655
Giddings & Lewis Machine Tool Co., Davis Boring Tool Div.	230
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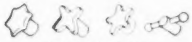

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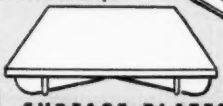

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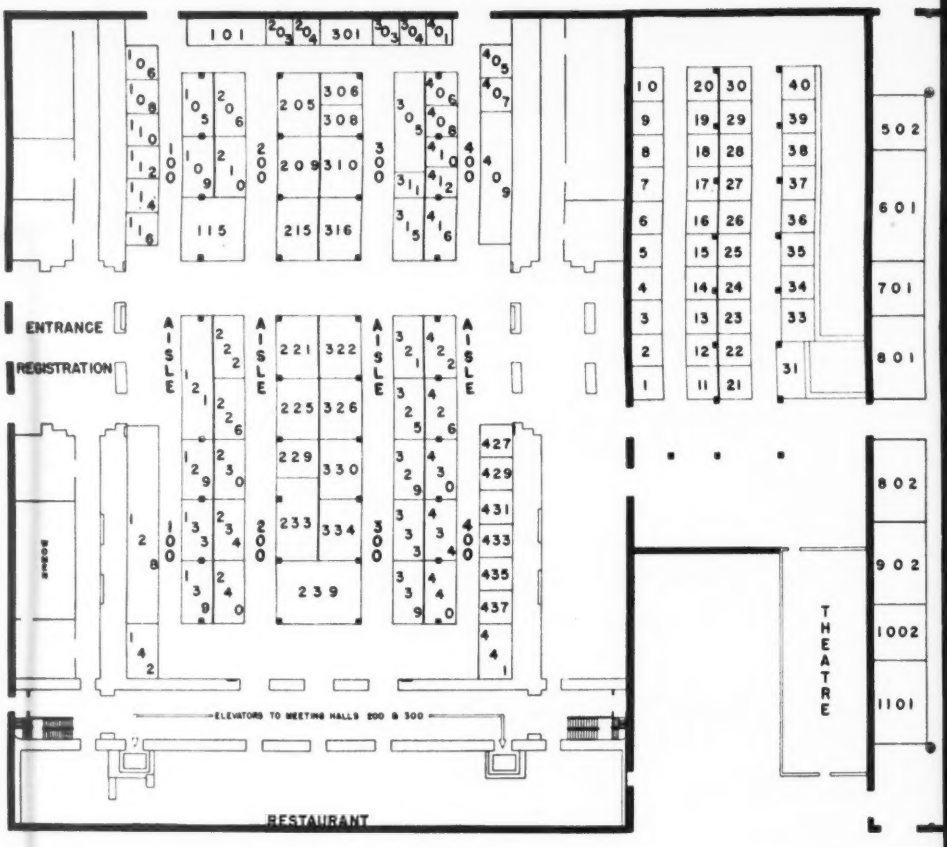

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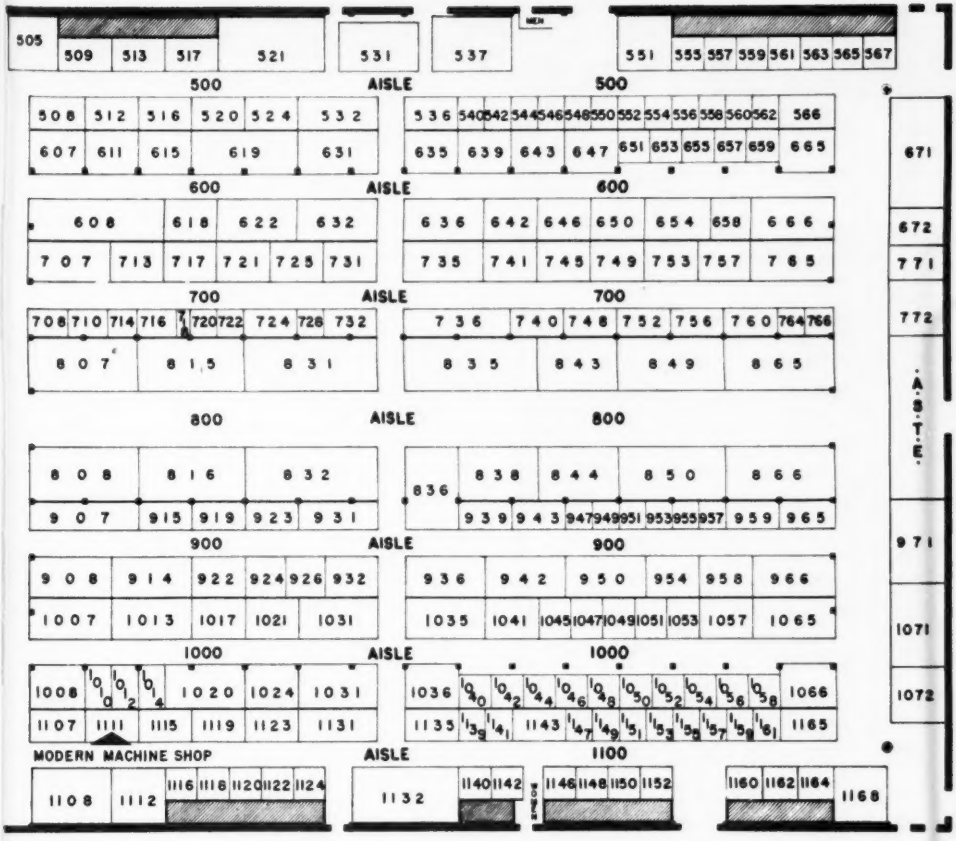
Company	Booth
Graham Manufacturing Corp.	672
Graham-Mintel Instrument Co.	1044
Griffith-Raguse & Co., Inc.	1112
F. T. Griswold Mfg. Co.	562
Grobet File Co. of America, Inc.	1153
Gulf Oil Company	615
H	
Hamilton Mfg. Co.	713
Hammond Machinery Builders, Inc.	725
Hanchett Magna-Lock Corp.	1164
Handy & Harman	607
Hanna Engineering Works	772
Hannifin Corporation	215
Hardinge Brothers Inc.	701
Hardinge Brothers Inc.	835
Hauser Machine Tool Corp.	838
Haynes Stellite Company, Unit of Union Carbide and Carbon Corp.	509
The Heim Company	559
Heintz Mfg. Co.	1002
The Herman Stone Company	
Hitchcock Publishing Company	548
The E. Horton & Son Co.	406
Hy-Air Products Company	951
Hy-Pro Tool Company	1159
I	
Ideal Industries, Inc.	1048
Illinois Tool Works	756
Index Machine Co.	1115
Industrial Diamond Association of America, Inc.	1071
Ingersoll Milling Machine Co.	950
Institute of Industrial Launderers, Inc.	552
Iron Age	210
J	
J & S Tool Company, Inc.	954
Jacobs Manufacturing Co.	671



PLANS

Company	Booth
Janney Cylinder Company	1036
Chas. L. Jarvis Company	807
Jergens Tool Specialty Company	112
Johnson Gage Company	1051
Jones & Lamson Machine Co.	831
K	
Machine Tool Division, Kalamazoo Tank & Silo Co.	1012
Kaufman Mfg. Co.	1120
Kellerflex Division, Pratt & Whitney Div., Niles-Bement-Pond Company	632
Kennametal Inc.	914
L	
Lassy Tool Company	556
Last Word Sales & Engineering Co.	1161
Latrobe Electric Steel Company	808
K. O. Lee Company	566
Link-Belt Company	721
Lipe-Rollway Corporation	115
Livingstone Engineering Co.	11
Logan Engineering Co.	1045
Logansport Machine Co., Inc.	707
Lovejoy Tool Company, Inc.	646
The Lufkin Rule Co.	508
Edward A. Lynch Machinery Co.	1072
M	
M-B Products Company	642
Machinery Magazine, The Industrial Press	101
Macklin Company	943
Madison Manufacturing Co.	513
Magnaflux Corp.	563
The Martindale Electric Co.	1147
Marvin Machine Products, Inc.	1010
The Metal Removal Co.	1160
Metal-Working, Sutton Publishing Co., Inc.	558

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Milton Equipment Company	619
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Modernair Corp.	957
Montgomery & Co., Inc.	1053
Moore Products Co.	301
Moore Special Tool Co., Inc.	1007
Morton Machine Works	437
Mueller Engineering Co.	639
McCaskey Register Company	561
N	
National Broach & Machine Co.	601
National Jet Company	1162
National Machinery Exchange	771
National Tool Co.	760
National Tool Salvage Company	1140
Nelco Tool Co., Inc.	561
New Hermes Engraving Machine Corp.	25
Nichols-Morris Corporation	931
Nife Incorporated	12
Nilsson Gage Co., Inc.	1151
C. A. Norgren Co.	635
Norton Company	409
O	
Oakite Products Inc.	565
The Ohio Crankshaft Co., Tocco Division	205
The O. K. Tool Company Div., Williams & Hussey Machine Co.	221
Tinius Olsen Testing Machine Co.	1146
O'Neil Irwin Mfg. Co.	316
Ortman-Miller Machine Co., Inc.	110
Ozalid, Div. of General Aniline and Film Corp.	537
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Pedrick Tool & Machine Co.	21
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Pines Engineering Co., Inc.	1168
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Porter Precision Products	142
The Frederick Post Co.	326
Horace T. Potts Co.	1165
Pratt & Whitney Division, Niles-Bement-Pond Company	815
Precise Products Company	441
Precision Detroit Company	544
Precision Grinding Wheel Company, Inc.	1046
Procunier Safety Chuck Co.	611
Production Engineering & Management, Bramson Publishing Company	657
Production Machine Co.	1042
The Producto Machine Co.	1065
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R	
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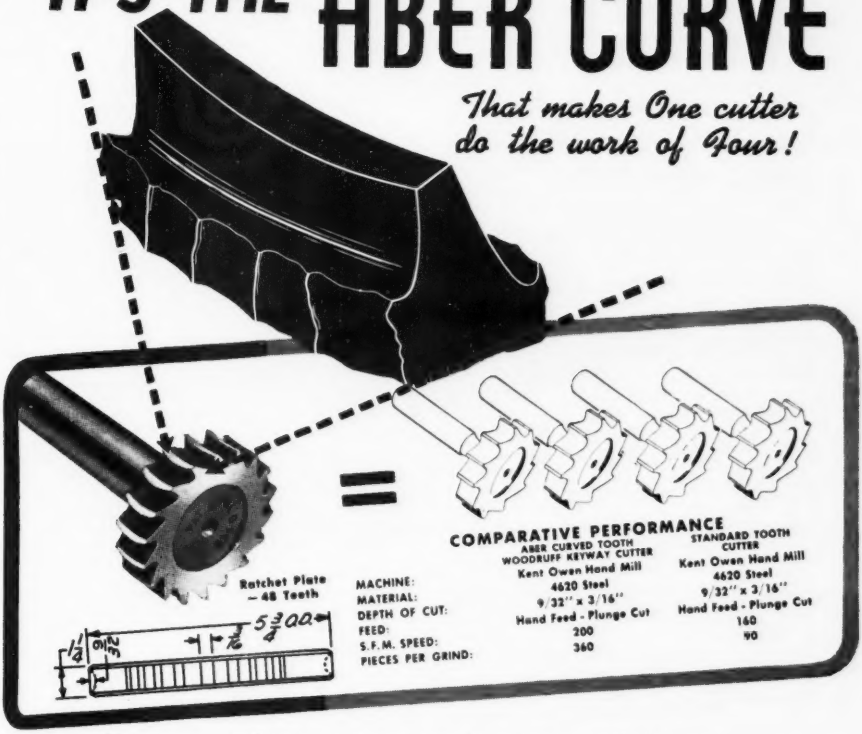

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S	
Sales Service Machine Tool Co.	902
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Sheffield Corporation	836
Sheldon Machine Co., Inc.	430
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Simonds Abrasive Company	516
Simonds Saw and Steel Company	516
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Size Control Co.	714
Socony-Vacuum Oil Company, Inc.	1035
South Bend Lathe Works	923
Sperry Products, Inc.	13
Standard Die Set Manufacturers, Inc.	926
Standard Electrical Tool Co.	965
Standard Gage Company, Inc.	932
Standard Pressed Steel Company	128
Standard Shop Equipment Co.	1157
The Staples Tool Company	745
Star Gauge Co.	540
L. S. Starrett Company	322
Steel Products Engineering Co.	431
Edwin B. Stimpson Co., Inc.	647
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Stone Machinery Company Inc.	106
D. A. Stuart Oil Co., Ltd.	116
Sun Oil Company	717
Sundstrand Hydraulic Division	907
Sundstrand Magnetic Products Co.	907
Sundstrand Pneumatic Div.	907
Sunnen Products Co.	531
Super Tool Company	315
Syntron Company	24
T	
Taft-Peirce Mfg. Co.	325
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Tool & Die Journal, Huebner Publications	114

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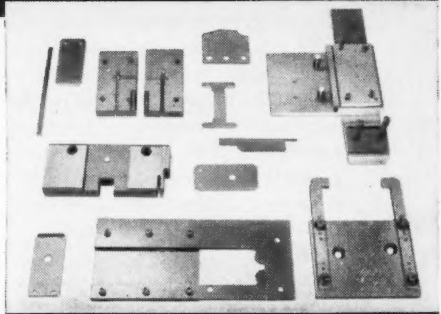

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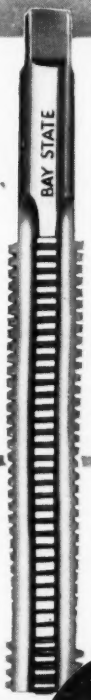

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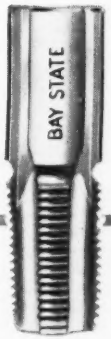

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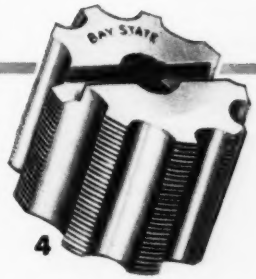

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U	
Union Manufacturing Company	650
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V	
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Vibro Modulator Mounts	748
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The Vulcan Tool Co.	844
W	
Waldes-Kohinoor, Inc.	1135
Wales-Strippit Corp.	908
Walker-Turner Division, Kearney & Trecker Corp.	105
Walsh Press & Die Co.	716
Watson-Flagg Machine Co., Inc.	1142
The Weatherhead Company	1041
Webber Gage Co.	708
Wesson Company	1013
West Point Mfg. Co.	1141
Western Tool & Mfg. Co.	1118
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The Wickman Manufacturing Co.	109
Wilson Mechanical Instrument Co., Inc., Ass. of American Chain & Cable Co., Inc.	226
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Zagar Tool, Inc.	1124

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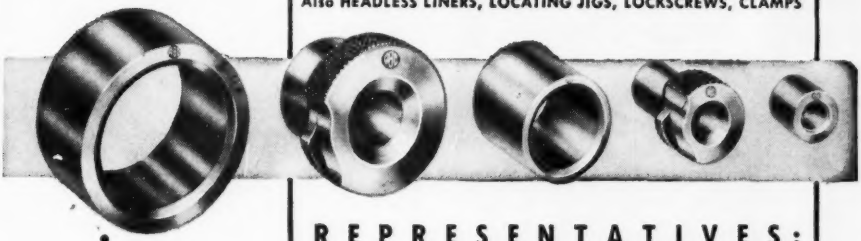

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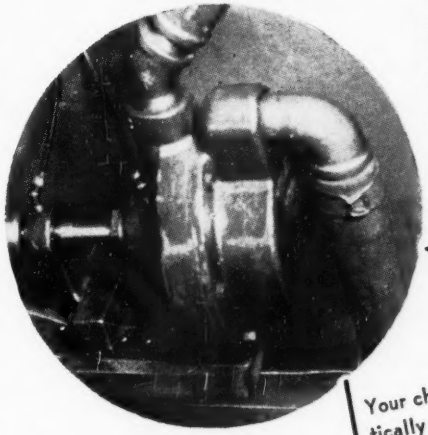

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BLANCHESTER, OHIO

ASTE
Technical Sessions

R. B. Schulze

G. F. Eglinton

J. Parker Bowden

MONDAY, APRIL 10

Morning — NO MORNING SESSIONS SCHEDULED

2:00 P. M. — "DEVELOPMENTS IN PRESSWORKING OF METALS"

(a) "Forming Sheet Metal by the Marform Process"

Speaker: R. B. SCHULZE, General Supervisor of Manufacturing Research, The Glenn L. Martin Company

(b) "Carbide Die Developments"
Speaker: G. F. EGLINTON, Vice President, Lincoln Park Industries

Session Chairman: ARTHUR R. DIAMOND, Mechanical Engineer, Jackson-Walter Company

Place: BALLROOM, CONVENTION HALL

2:00 P. M. — "COLD EXTRUSION OF METALS"

Speaker: J. PARKER BOWDEN, Heintz Manufacturing Co.

Session Chairman: A. D. JACKSON, President, Jackson-Walter Co.

Place: ROOM 200, CONVENTION HALL

8:00 P. M. — "ECONOMIC FORUM"

Chairman: J. S. HILDRETH, President, Chilton Co.
Moderator: DR. EDWIN G. NOURSE

Place: PHILADELPHIA ACADEMY OF MUSIC

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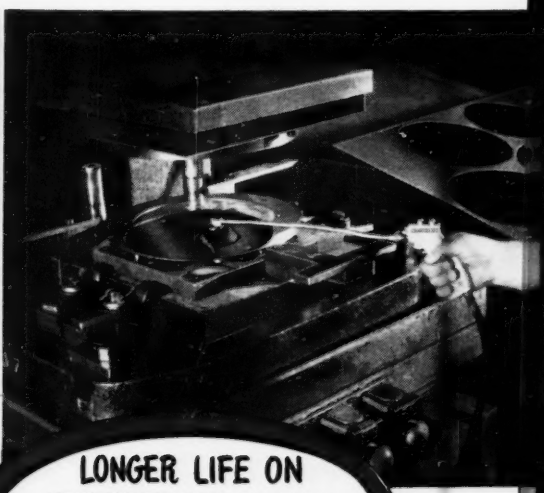
Die assembly work is easier and more accurate when it's based on reliable Danly precision.



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- Long Island City 1, 47-28 37th Street
- Los Angeles 54, Ducommun Metals & Supply Co., 4890 South Alameda
- Milwaukee 2, 111 East Wisconsin Avenue
- Philadelphia 44, 18 West Chelten Avenue
- Rochester 4, 16 Commercial Street

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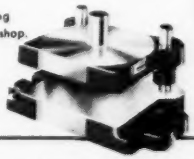

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TUESDAY, APRIL 11

Chas. Franklin

9:00 A.M. "DESIGN AND USE OF DIECASTING DIES"

Speaker: CHAS. FRANKLIN, Master Mechanic, Rochester Products Div., General Motors Corp.

Session Chairman: J. O. HORNE, Sales Manager, Jas. O. Horne & Company

Place: ROOM 200, CONVENTION HALL

N. L. Bean

2:00 P. M. "AUTOMATION OF GROUND AND TURNED PRODUCTION PARTS"

Speaker: N. L. BEAN, Chief Design Engineer, Automatic Transmission Program, Ford Motor Company

Session Chairman: CAMPBELL PITTSINGER, Engineering Dept., SKF Industries

Place: ROOM 200, CONVENTION HALL

2:00 P. M. "MACHINING AND FABRICATION OF HIGH-TEMPERATURE ALLOYS"

Speaker: C. L. SADON, Mfg. Engr., Aircraft Gas Turbine Div., General Electric Co.

Session Chairman: GARDNER YOUNG, Tool Supervisor, Westinghouse Electric Corp.

Place: BALLROOM, CONVENTION HALL

8:00 P. M. "MACHINABILITY"

Speaker: R. T. HURLEY, President, Curtiss-Wright Corp.

Session Chairman: A. H. d'ARCAMBAL, Vice President, Pratt & Whitney Div., Niles-Bement-Pond Company

Place: BALLROOM, BENJAMIN FRANKLIN HOTEL

C. L. Sadon

8:00 P. M. "TRENDS IN DRILLING"

(a) "Application of Special Drill Units to Standard and Special Machinery"

Speaker: EUGENE NUMRICH, Application Engineer, Avey Drilling Machine Company

(b) "Micro Drilling"

Speaker: J. A. CUPLER II, General Manager, National Jet Co.

Session Chairman: H. S. HUNT, Plant Supt., Sipp-Eastwood Corp.

Place: ROSE ROOM, BELLEVUE-STRATFORD HOTEL

R. T. Hurley

Eugene Numrich

J. A. Cupler II

W. O. Sweeny, Jr.

E. J. Vanderploeg

W. L. Mantz

T. E. Darnton

WEDNESDAY, APRIL 12

9:00 A.M. "METAMICS"

Speaker: W. O. SWEENY, JR., Asst. Sales Manager, Haynes-Stellite Div., Union Carbide & Carbon Corp.

Session Chairman: D. J. HECKINGER, Tools, Inc.

Place: ROOM 200, CONVENTION HALL

2:00 P. M. "COLD ROLL FORMING OF METALS"

Speaker: E. J. VANDERPLOEG, Dev. Engr., The Yoder Co.

Session Chairman: G. A. ROGERS, Sales Engr., Rudel Machy. Company, Ltd.

Place: ROOM 200, CONVENTION HALL

2:00 P. M. "AUTOMATION"

(a) "Automation in Forging and Heat Treating"

Speakers: THOMAS E. DARNTON, Supervisor of Standards, and WILLARD L. MANTZ, Supervisor of Production Engineering, Oldsmobile Division, General Motors Corp.

(b) "Automation in the Press Room"

Speaker: HERMAN ZORN, President, V & O Press Company

Session Chairman: JOHN WHITESELL, Superintendent of Plant Engineering, The Budd Company

Place: BALLROOM, CONVENTION HALL

8:00 P. M. "TOOLING UP FOR MODERN TRUCK ENGINE PRODUCTION"

Speaker: JOSEPH OLENDER, Mechanical Engineer, International Harvester Company

H. F. Zorn

Joseph Olender

N. M. Perris

H. K. Keever

J. G. Morrison

B. A. Taylor

O. W. Bonnafe

C. E. Kraus

WEDNESDAY, APRIL 12

Session Chairman: J. R. WEAVER, Vice President, Baldwin Locomotive Works

Place: BALLROOM, BENJAMIN FRANKLIN HOTEL

8:00 P. M. "USE OF ELEMENT TIME DATA FOR EFFECTIVE TOOL DESIGN"

Speakers: N. M. PERRIS and H. K. KEEVER, Partners, Stevenson, Jordan & Harrison, Inc.

Session Chairman: C. F. STEPHENSON, Chief Process Engr., York Corporation

Place: ROSE ROOM, BELLEVUE-STRATFORD HOTEL

THURSDAY, APRIL 13

9:00 A.M. "HARD SURFACING OF PRODUCTION TOOLS AND GAGES"

(a) "Nitriding of High Speed Steel Tools and Gages"

Speaker: J. G. MORRISON, Chief Metallurgist, Landis Machine Company

(b) "Hard Chrome Plating"

Speaker: B. A. TAYLOR, Vice President, Chrome Electro-Forming Company

Session Chairman: ERIC LUND, Chief Tool Engr., Link-Belt Co.

Place: BALLROOM, CONVENTION HALL

2:00 P. M. "BROACHING APPLICATIONS FOR COST REDUCTION"

Speaker: O. W. BONNAFE, Chief Research Engr., The LaPointe Machine Tool Company

Session Chairman: P. A. PATTERSON

Place: BALLROOM, CONVENTION HALL

2:00 P. M. "AUTOMATION IN HOPPER FEEDS FOR ASSEMBLIES"

Speaker: C. E. KRAUS, President, Kraus Design, Inc.

Session Chairman: FRANK J. DeFRATES, Superintendent, Kruse & Slattery

Place: ROOM 200, CONVENTION HALL

Evening: ANNUAL BANQUET

Place: BALLROOM, BELLEVUE-STRATFORD HOTEL

J. Van Hamersveld

T. F. Frangos

Dr. M. Kronenberg

FRIDAY, APRIL 14

9:00 A.M. "DESIGN ECONOMICS"

Speaker: JOHN VAN HAMERSVELD, Supervisor, Design Cost Control Group, The Glenn L. Martin Company

Session Chairman: DWIGHT RENFREW, General Superintendent, Link Belt Company

Place: BALLROOM, CONVENTION HALL

2:00 P. M. "INVESTMENT CASTING"

Speaker: T. F. FRANGOS, Sales Engr., Haynes-Stellite Div., Union Carbide & Carbon Corp.

Session Chairman: E. HOLLINGSWORTH, Tools, Inc.

Place: BALLROOM, CONVENTION HALL

2:00 P. M. "EFFECT OF LATEST AMERICAN STANDARDS ON SPINDLE DEFLECTIONS"

Speaker: DR. MAX KRONENBERG, Consulting Engineer

Session Chairman: EMIL KITZMAN, Sales Engr., W. E. Shipley Machinery Company

Place: ROOM 200, CONVENTION HALL

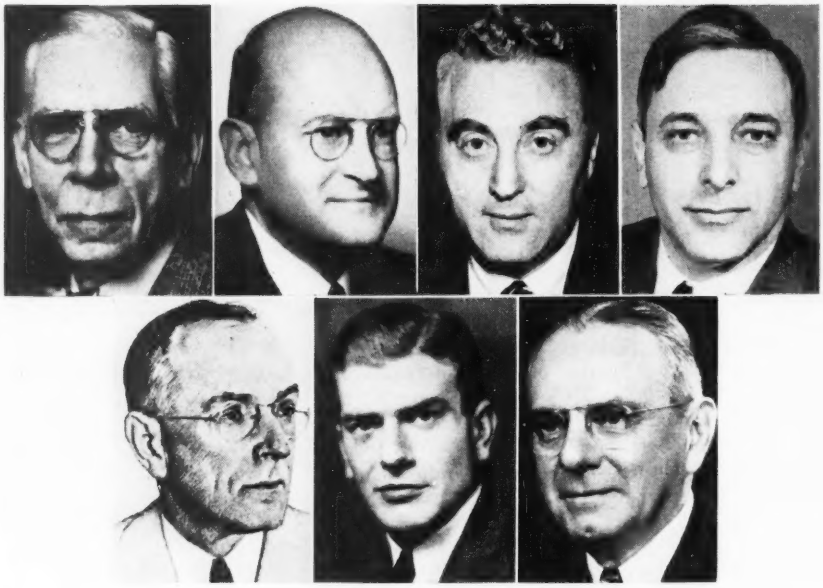
SCHEDULE—A.S.T.E. PLANT TOURS—APRIL 10-14, 1950

COMPANY	April 10 Mon. AM	April 10 Mon. PM	April 11 Tues. AM	April 11 Tues. PM	April 12 Wed. AM	April 12 Wed. PM	April 13 Thurs. AM	April 13 Thurs. PM	April 14 Fri. AM	April 14 Fri. PM
Yale & Towne Mfg. Co.		X		X		X		X		
Link-Belt Company			X		X		X		X	
Budd Company		X		X		X		X		
Baldwin Locomotive Wks.			X		X		X		X	
Westinghouse Company		X		X		X		X		
SKF Industries			X		X		X		X	
RCA—Camden			X		X		X		X	
Philco Corp.		X		X		X		X		
Crown Can Co.			X		X		X		X	
Campbell Soup (ladies' tour)						X				

Morning Tours: Buses will leave Convention Hall promptly at 9 A.M. and return at 12 noon on Tuesday, Wednesday, Thursday and Friday.

Afternoon Tours: Buses will leave Convention Hall promptly at 1 P.M. and return at 4 P.M. on Monday, Tuesday, Wednesday and Thursday.

Ladies' Tour: Ladies' tour will be on Wednesday to Campbell Soup in Camden. Buses leave at 1 P.M.



(Above) Dr. Edwin G. Nourse, Dr. C. Canby Balderston, Edward T. Cheyfitz, Joseph A. Livingston
(Below) Walter D. Fuller, Robert B. Douglas, Paul Wooton

Economic Forum

FOUR of the leading practical economists of the United States will meet in a public Economic Forum in Philadelphia, the evening of April 10, at the Academy of Music to present and discuss their respective viewpoints as to our present economic situation and the outlook for the future. The session is sponsored cooperatively by a Committee of Publishers and the American Society of Tool Engineers in connection with the Industrial Cost-Cutting Exposition opening in Philadelphia on that day.

The four, all leaders in their field, are Dr. Edwin G. Nourse, formerly Chairman of the Council of Economic Advisers to the President and a founder of Brookings Institution; Dr. C. Canby Balderston, Dean of the Wharton School of Finance and Commerce and outstanding authority on industrial relations; Edward T. Cheyfitz, labor economist and youngest man ever to be elected to the National Executive Board of the CIO, and Joseph A. Livingston, business economist and formerly economic assistant to the Chief, Office of War Mobilization and Reconversion.

Preceding the actual Forum will be an introductory address by Walter D. Fuller, President of Curtis Publishing Company and Vice-Chairman of the Committee for Economic Development.

The meeting will have an international flavor, since it will be opened by Robert B. Douglas, President of the American Society of Tool Engineers. Mr. Douglas is a Canadian and President of Godscroft Industries, of Montreal.

Paul Wooton, President, The Society of Business Magazine Editors and Secretary-Treasurer of the White House Correspondents' Association, will introduce the various speakers.

Chairman of the Publisher's Committee is Joseph S. Hildreth, President of the Chilton Company, Philadelphia.

Dr. Nourse, who resigned as Economic Adviser to the Executive Branch of our government rather than let his economic thinking be influenced by political considerations, will act as Chairman of the Forum.

Dr. Balderston and Cheyfitz have also held important positions in government. Dr. Balderston was Chief of the War Department Wage Administration Agency. Cheyfitz was Economic Advisor on Labor to the War Production Board.

For further information on any product mentioned in this issue — use the READER SERVICE CARD between the covers.

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ALL PURPOSE

INDICATOR

DOUBLE FACE
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THE UNOBSCURED DOUBLE READING IS VERY PLEASING TO LOCATOR MEN.

DETACHABLE SPRING-CLIP MOUNTS SCREW AND HEIGHT GAGE BAR.

NO NEED TO FEAR REMOVING LID.

THE WORKS DO NOT FALL OUT.

1/8", 1/16" and 1/32" CONTACT POINTS. ALL INTERCHANGEABLE IN ONE INDICATOR.

1/16" and 1/32" POINTS CHROME PLATED.

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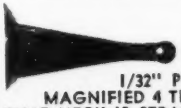
LONG SLENDER HOUSING.
POINT HAS MORE THAN 180° SWING.



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INDICATOR WITH 1/8" POINT . . $7.60.

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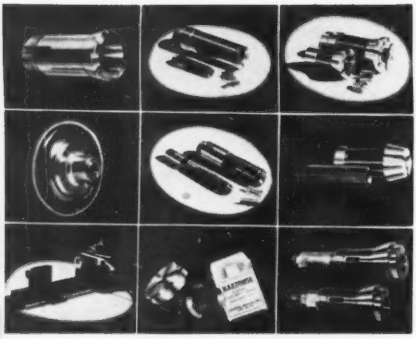


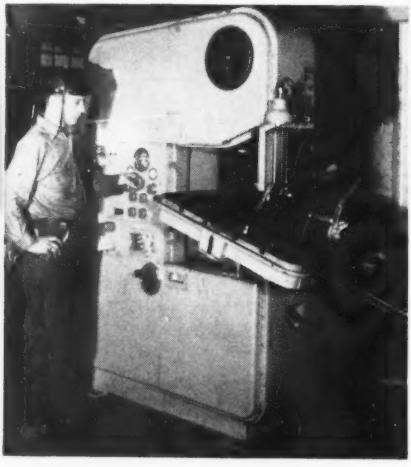
Preview

A preview of machines, cessories which will Industrial

Booth No. 701 of Hardinge Brothers, Inc., Elmira, N. Y., will exhibit a complete line of precision Sure-Grip master collets and pads; conventional master collets and pads; Style "B" master feed fingers and pads; conventional master feed fingers and pads; regular collets and feed fingers; circular form tools; circular cutoff tools; lathe collets; collet index fixtures; step chucks, and nose type Hardinge-Sjogren speed collet chucks.

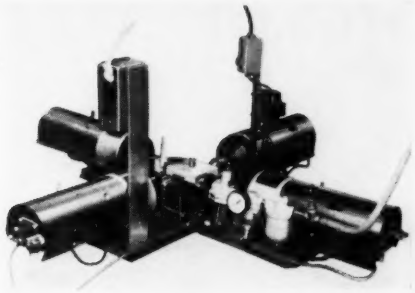
« »

Line Milling and Line Grinding, two new developments for band machining, will be revealed by The DoAll Co., Des Plaines, Ill., as it introduces its new Contour-matic manufacturing machine tool in Booths Nos. 121 and 125. The Contour-matic provides complete hydraulic operation on its control of tool speed, work table feed, tool post, table tilt, blade tension, and brakes. Twenty-seven band cutting tools, developed for this machine, permit sawing, milling, filing, grinding, honing, and polishing operations. For Line Milling operations a band cutting tool with tungsten carbide tipped teeth is used which is designed to withstand high frictional temperatures encountered at the tooth tip. DoAll Line Milling Bands are recommended for cutting low thermal conductivity, certain air hardening, and abrasive type materials. For the cutting and shaping of hardened dies, tools, and high temperature alloys, the new DoAll Line Grinding and Honing Blade is available. This blade is a tough alloy band on which cubical molded abrasive matrices are welded in the form of teeth. In its cutting action there is an equalized balance between bonding and abrasive grits which provides a constant degree of abrasive exposure. The blade is available in 54, 60, 70 and 80 grit for cutting and grinding many different types of alloys, geological materials, and so on. "Cool Grinding" on the DoAll super precision surface grinder will also be demonstrated to show how this grinding method cools both the work and cut.



Section

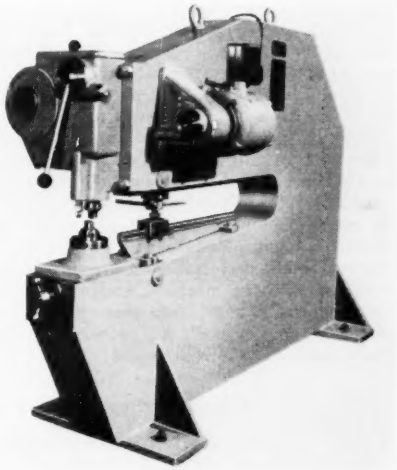
**tools, and machine ac-
be on display at the
Exposition**

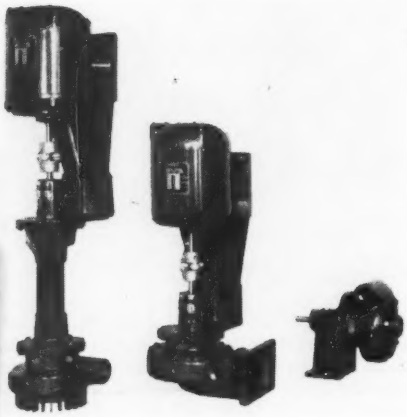


In Booth No. 724, Black Drill Co., Cleveland 17, Ohio, will exhibit new models of Black drilling units, as well as "Hardsteel" drills for drilling in hardened steel. The Illustration herewith shows a setup utilizing four Black drilling units. This special machine includes a simple hand loaded fixture, the workpiece being a zinc die casting in which four holes are drilled simultaneously, the four drilling units working in unison from a common push-button station. Each drilling unit is air operated and includes a transversing rotor and built-in hydraulic check for controlling feed rate. The units may be used in any position or at any angle in conjunction with semi-automatic or fully automatic transfer or indexing type machines.

« »

Main attraction of the line of sheet steel and plate cutting machinery to be displayed in Booth No. 958 by American Pullmax Co., Inc., Chicago 47, Ill., will be the Pullmax Major (illustrated). Largest of the line of seven machines, the Pullmax Major is said to cut materials from the finest gauge steel up to plate of 11/32-inch thickness. Pullmax machines can be used for straight cutting, inside or outside circle cutting, inside or outside square cutting, inside or outside design cutting, slot cutting, beading, folding, flanging, and nibbling. They are also claimed to work on stainless steel, as well as all types of nonferrous metal, wire mesh, and plastic sheets.





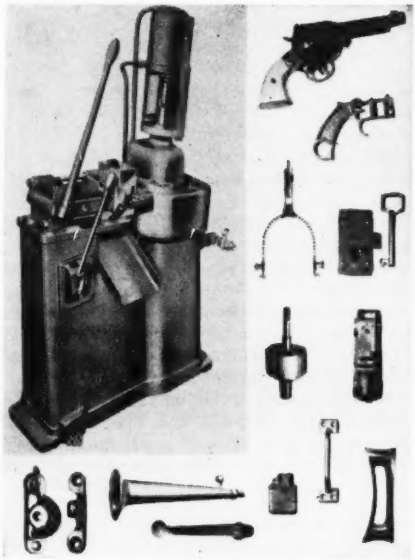
A full line of centrifugal coolant pumps, all conforming to J.I.C. standards to permit the use of any N.E.M.A. motor, will be shown in Booth No. 532 by Pioneer Pump & Mfg. Co., Detroit 3, Mich. The accompanying illustration shows the Pioneer method of mounting any standard motor by use of a flexible coupling and a motor-mounting bracket. The assembly shown at the left is a submersible type designed for installation inside the coolant tank and normally rests directly on the bottom of the tank or reservoir, with tank brackets and flanges available to facilitate mounting on the edge, side or top. The assembly in the center is built to mount on the side of a coolant tank or machine pedestal for a close-coupled installation. The assembly on the right is built for various types of connections to the driving unit and may be operated vertically or horizontally.

« »

The exhibit in Booth No. 133 of Boyar-Schultz Corp., Chicago 12, Ill., will feature a screw machine running on a difficult job which will illustrate the advantages of a new turret tool. This working exhibit will also show five other Boyar-Schultz tools in action. In addition, profile grinders and surface grinders will be shown, including the new Model 6-12 Surface Grinder.

« »

The Model M55 A/HF-1P High Speed Die Casting Machine shown herewith will be in operation in Booth No. 412 of DCMT Die Casting Machine Tool Corp., New York 13, New York. This 1-lb. capacity zinc alloy high speed die casting machine utilizes the principle of fast chill and high cycling speed on single impression dies. An average production speed of 500 to 700 shots per hour is said to be maintained by the machine, which is designed to accommodate dies up to 6 x 9 inches. Small prefabricated die blanks are supplied with the machine, and cavities can be machined directly into these blanks. The machine requires a floor space of 24 x 12 inches and weighes 470 pounds.



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ENGRAVING MACHINE

Interchangeable heads for engraving, electrical marking, and acid etching . . . available for all models. Also Panto engraving cutters, cutter grinders, master copy type, endless belts and accessories.

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The PANTO
MODEL UE-3
SEVERAL OTHER MODELS AVAILABLE

H. P. PREIS ENGRAVING MACHINE CO.

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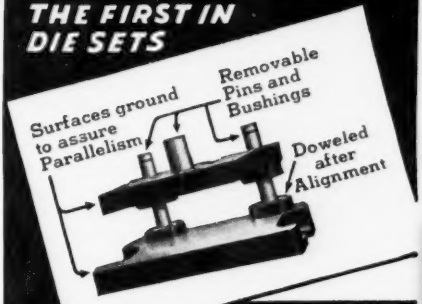
BAUMBACH
THE FIRST IN DIE SETS



Being originators of Standard Die Sets naturally we are steps ahead in Design — Precision — Dependability and Economy. Baumbach Die Sets can be disassembled. The Leader Pins and Bushings can be used on other size Die Sets — reducing inventorying a lot of Die Sets. Costly machining time is also reduced.

Learn all about Baumbach advantages before you buy. Write for circular.

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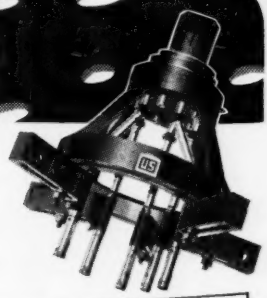
Figure the HOLE Cost!

ADJUSTABLE
MULTIPLE DRILL HEADS
Fit any machine, 2 to 10 Spindles.
Save 2 to 10 Operations.



PRICES: 6" DRILLING AREA
¼ capacity
21/32 center

U-1	3 Spindle Head	$165.00
	4 " "	171.00
	5 " "	176.00
	6 " "	187.00
	7 " "	198.00
	8 " "	220.00

PRICES: 10" DRILLING AREA
½ capacity in cast iron standard
¾ special adaption in cast iron

U-2	3 Spindle Head	194.00
	4 " "	224.00
	5 " "	254.00
	6 " "	284.00
	7 " "	313.00
	8 " "	343.00
	9 " "	373.00
	10 " "	403.00

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SINCE 1915

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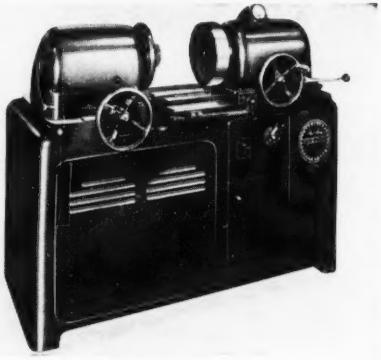
IMMEDIATE DELIVERY!

Also manufacturers of all types of fixed center heads

UNITED STATES DRILL HEAD CO.
Dept. C, 616-618 Burns St., Cincinnati 4, Ohio

National Broach & Machine Co., Detroit 13, Mich., will exhibit, in Booth No. 601, equipment for checking gears dimensionally and also for the sound testing of gears, including the new sound tester illustrated herewith. This machine is built for external and internal gears and is said to be especially suitable for planetary gear assemblies, such as those used in automatic transmissions. The machine is available in two sizes, one for gears up to 14 inches in diameter and the other for gears up to 24 inches in diameter, and can be equipped for air clamping. The exhibit will also include recently designed broaches.



« »

The exhibit in Booths Nos. 914-918½ of Kennametal Inc., Latrobe, Pa., will feature several mechanical units, in which typical machining jobs are demonstrated on actual workpieces with tools in cutting position. Many other jobs will be illustrated by means of a selective slide projector. The exhibit will include displays of clamped-on tools—H-type and improved Kennamatics; conventional brazed tools; Kennamills; wear-resistant parts; balls for hole sizing; strip mill rolls; disc files; saws for wood and plastics; router bits; and specimens of Kentanium, the new high temperature titanium alloy.

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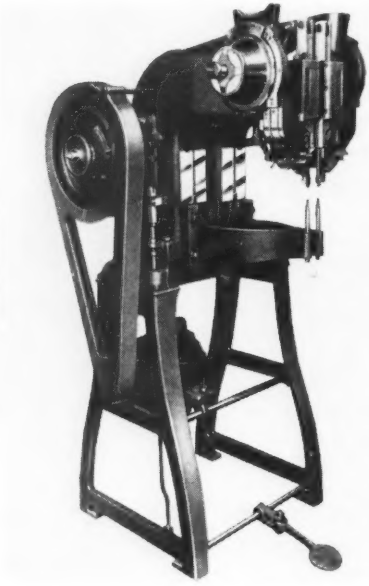
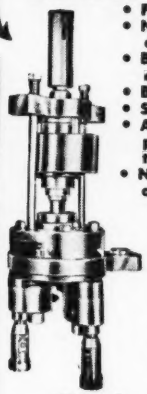


Among the machines which will be exhibited in Booth No. 1123 by Chicago Rivet & Machine Co., Bellwood, Ill., is the recently designed Model 214 Double Rivet Setter shown herewith, which will be in operation. The machine has a 14-inch throat and will set 9/64-inch steel tubular rivets, including lengths to ⅝ inch. The standard unit has riveting centers which are adjustable from ⅜ to 7 inches. Special models are available having riveting centers from ⅜ to 15 inches.

Only ERRINGTON *Adjustable* TAPPING HEAD Offers So Many Advantages



- Fully geared
- Needle bearings on all spindles in head
- Ball thrust bearings throughout
- Bronze bushed
- Sand cast aluminum case
- All parts fully enclosed for pressure lubrication and protection
- Non-slip positive clamping on all adjusting members

Here's a versatile tool which permits you to take advantage of a wide range of adjustment — without overhang. Supplied with 3 spindles for equal adjustment in line and 3, 4, 5 or 6 spindles for equal adjustment on bolt circles.

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See our exhibit A.S.T.E., April 10-14, Booth 554

ERRINGTON Mechanical Laboratory, Inc.

Main Office and Plant:

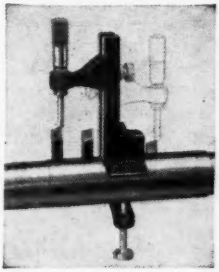
STATEN ISLAND 4, NEW YORK

SAVE TIME

With

Bartelt

Gages



• Use a Bartelt Pedestal Micrometer for setting boring tools and for many other shop operations requiring accurate positioning relative to a fixed base. Make settings in one step — eliminate cut-and-try-methods. Model B, with reversible slide, shown. *Write for literature describing all models.*

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CONTINUOUS OIL GROOVING

WICACO CONTINUOUS OIL GROOVER cuts grooves of all descriptions, internal or external, continuous or intermittent.

Send us samples for grooving. We will return them cut to specifications, with a record of time and cost estimate. No obligation.

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MACHINE CORPORATION

WAYNE JUNCTION, PHILA. 44, PA.

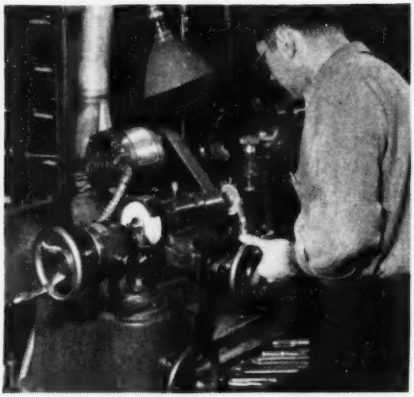
Manufacturers of

Precision Machinery and Machine Parts

Roller Bearing Twister Spindles—Spindle Oiling Machine

Precision Internal Grinder — Screw Machine Products.

On display in Booth No. 401 by Henry P. Boggis & Co., Cleveland 10, Ohio, will be the "Hybco" Tap Grinder, which provides proper facilities for complete tap sharpening. The accompanying illustration shows a Model 110 Hybco Tap Grinder in operation at the tool and cutter department of The Warner & Swasey Company.



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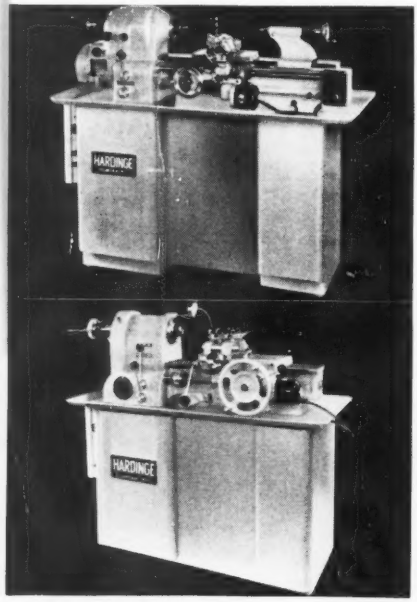
In Booth No. 607, Handy & Harman, New York 7, N. Y., will have an operating exhibit in which the joining of ferrous and non-ferrous metals with the silver brazing alloys, "Easy-Flo" and "Sil-Fos," will be featured. Also displayed will be a group of typical parts being fabricated by well-known companies.

« »



Hardinge Brothers, Inc., Elmira, N. Y., will exhibit toolroom and production machines in Booth No. 835. The booth will be separated into two sections, one section for visitors interested in toolroom equipment and the other section for those interested in production machines. The toolroom section will contain three machines matched for precision work; namely, the new Hardinge Model HL Toolroom Lathe (upper illustration) with full bearing carriage, precision gearbox for threading only, independent electric power drive for infinitely variable rate of carriage and cross slide feed, and hardened and precision ground steel dovetail bed ways; Model UM Universal Milling Machine for high speed toolroom milling operations; and Model DV59 Precision Lathe for operation at spindle speeds up to 4,000 r.p.m. The production machine section of Booth No. 835 will show the new Hardinge Model HC (lower illustration) and Model HCT Chucking Machines for large diameter chucking work; Model AC59 Second Operation Machine for high speed precision finishing of small parts; Model DSM59 Precision Second Operation Machine for production threading; and Model AQ59 Hand Screw Machine.

MILL IT ON YOUR LATHE

PALMGREN MILLING ATTACHMENT

No. 250 $24.75

Convert Lathe in 10 Seconds

Mill, slot, grind, groove, square shafts, recess—on lathe. Shops, schools, homes need this fixture. Fits Craftsman, Atlas, So. Bend, Logan, Sheldon, Perkins. Accurately graduated for rotary and vertical feed. No. 150, 1½" Jaw $18.75; No. 250, 2½" Jaw $24.75; No. 400, 4" Jaw $39.75.

Write for Circular No. 354

CHICAGO TOOL and ENGINEERING CO.
8399 South Chicago Ave. Chicago 17, Ill.

STOP DUST

DUSTKOPS — **20 Models**

UNIT TYPE — **300 to 3600 cfm**

LOW COST — **¼ hp to 5 hp**

AVAILABLE FROM STOCK

For: Grinders, buffers, polishers, woodworking, lint . . . All Dusts.

Send for Cat. 605a; describe problem.

AGET-DETROIT CO. • ANN ARBOR, MICH.

ANY SPRING IN 60 SECONDS

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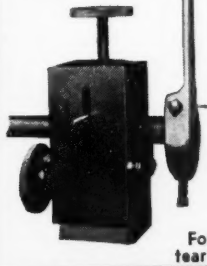

1. 60 second action for a spring 12" long.
2. Ideal for tool room and maintenance shop.
3. Mandrel capacity to 1½".
4. Wire capacity up to .229" diameter.
5. Pitch capacity up to 1".
6. Clamps in your bench vise.

Price $35

Other small shop sizes from $20

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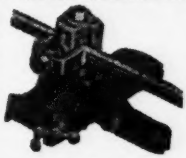
Since 1874
53 Park Place, N. Y. 7, N. Y.

The First MAJOR Holder IMPROVEMENT In 25 Years

GLOBE BORING BAR HOLDER

Exclusive dual clamping arrangement permits independent adjustment of bar or alignment of holder—either may be made without disturbing the other. For lathes from 8" to 36" swing.



COMPLETE SETS
(With three bars)

Set No.	Diameter Bar Inches	Tool Bit Inches Square	For Lathe Swing Approx.	Price Complete
0-AA	*⅜, ½, ¾	*, 5/16, ¼	8" to 12"	$ 16.40
1-A	½, ¾, 1⅛	5/16, ¼, ⅜	12" to 16"	26.35
2-A	5/16, 11/16, 1 5/16	5/16, 5/16, ⅜	16" to 18"	35.15
3-A	¾, 1⅛, 1½	¼, ⅜, ½	20" to 22"	61.55
4-A	11/16, 1 5/16, 1⅞	5/16, ⅜, ⅝	24" to 36"	87.95
6-A	1½, 1⅞, 2½	½, ⅝, ¾	24" to 36"	193.50

* ⅜" diameter bar included in set is solid tool steel.

GLOBE BORING BARS
(Calibrated)

Bar No.	Dia.	Length	Tool Bit	Price
162A	⅜"	7"	⅛	$3.50
122A	½"	8"	5/16	3.50
123A	5/8"	9"	5/16	3.50
124A	⅝"	10"	5/16	3.50
125A	¾"	11"	¼	4.35
126A	11/16"	13"	5/16	6.30
127A	1"	14"	5/16	6.30
128A	1⅛"	16"	⅜	8.75
129A	1 5/16"	18"	⅜	12.30
130A	1½"	23"	½	16.30
176A	1⅞"	30"	⅝	36.35
155A	2½"	36"	¾	72.70

Permanently graduated in ¼" calibrations indicating depth of bore. Eliminates necessity for file and chalk marks.

SPEEDS PRODUCTION

HIGH SPEED CUTTER BITS

1/8x1/2	1/8x2½	5/16x1/2	5/16x1¼	5/16x2½	¼x1¼	¼x2½
.20	.30	.20	.25	.30	.25	.35

5/16x1¼	5/16x2½	⅜x1½	½x2	⅝x2¼	⅝x4½	¾x2½
.30	.45	.40	.85	1.25	2.25	2.15

DISTRIBUTED BY BETTER DEALERS EVERYWHERE

WRITE FOR DETAILED INFORMATION

GLOBE PRODUCTS MANUFACTURING CO.

3380 Robertson Blvd., Los Angeles 34, California, U.S.A.

Carbide twist drills in sizes and types suitable for the proper application of carbide to drilling will be displayed in Booth No. 315 by Super Tool Co., Detroit 13, Mich. Designed for drilling in cast iron, brass, copper, aluminum, and so on, the drills are available in both carbide-tipped and solid carbide types, the latter in sizes from 1/4 inch in diameter down to No. 53. Carbide-tipped drills range from 1 inch in diameter down to No. 32 in regular spiral, and from 1/2 inch in diameter down to No. 15 in fast spiral. Slow spirals are made in sizes from 1/2 inch down to No. 32. Other carbide tools to be displayed include ejector type tools; shell end mills; plain, side and face milling cutters; biaxial slotting cutters; saws; step milling cutters; end mills; reamers; adjustable blades for reaming and boring; counterbores; core drills; centers; twist drills; glass drills; masonry drills; Super Hard drills for hardened steel; straight flute drills; and carbide single point for turning, facing, threading and boring.

« »

A feature of the exhibit in Booth No. 322 of The L. S. Starrett Co., Athol, Mass., will be the official introduction of 25 new tools being added to the Starrett lines of precision measuring tools and dial indicators. Typical of the precision measuring tools to be introduced is a new Starrett Vernier Height Gage No. 354 (left illustration) which features a slotted base that permits taking direct readings or scribing lines at any point from the base surface of the tool up to the limit of its capacity. The tool is said to be ideal for layout work, jig and fixture making or similar work requiring close accuracy because of its fine adjustment which permits measuring or marking off vertical distances ranging from 0 to 6 inches in thousandths of an inch without calculations. Among the dial indicators and dial indicator gages to be presented is a Portable Dial Hand Gage No. 1015 (right illustration) designed for gaging the thickness of parts and materials, including metal, rubber, textiles, paper, plywood, leather, veneer, mica, celluloid, cardboard and so on. The gage is easily held in one hand by means of "natural grip" finger holes and is operated by pressing a thumb lever which raises the spindle. It is available in two thickness capacities. Other new dial indicators and gages to be displayed include a universal dial bench gage with sliding table and fine adjustment; dial comparator with fine vertical adjustment of the indicator; several dial depth gages; and a Starrett "Last Word" Test Indicator with universal friction holder, universal shank and many other useful attachments. New precision measuring tools will include a universal precision gage with fine adjustment; "Satin Chrome" Micrometer Calipers with tapered frame; both tubular rod and solid rod inside micrometers with "Satin-Chrome" finish; and a complete line of micrometer depth gages with 2 1/2, 3, 4, and 5-inch base.

Small
Precision Pins

DOWEL - STRAIGHT
COUNTERSUNK - TAPER
Made to Blueprint

Centerless Ground
to ±.0001" Accuracy

.030" to .125" Diam.
.125" to 2" Length

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Complete Centerless Service
Since 1931

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CENTERLESS
GRINDING CO.
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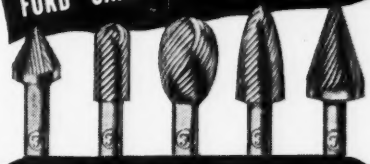
Over 40
FORD CARBIDE CUTTER SHAPES



FORD
CARBIDE ROTARY CUTTERS
—MACHINE GROUND

For filing, grinding and finishing, burring, countersinking and chamfering, light milling, profiling, tool, die and mold machining, Ford carbide cutters will do a better job in less time at a lower cost—and without a major capital investment. *Send for Bulletin C-549—Sizes and Specifications.*

M. A. **FORD** MFG. CO. INC.
Davenport 4, Iowa

YOU'VE GOT TO BE SURE OF YOUR HARDNESS
. . . INSIST ON **CLARK** TEST BLOCKS

Price Each: $1.50, F.O.B. Detroit

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TOMORROW'S ACCURACY TODAY
INSTRUMENT, INC.
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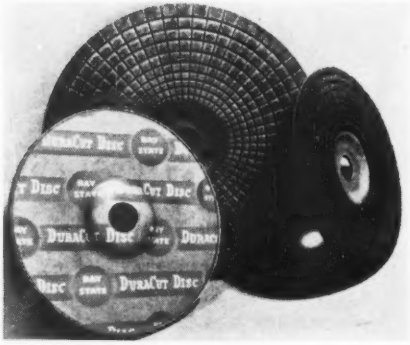
Your hardness tester is useful only when you are sure it is giving you accurate, dependable readings. You can rely on the accuracy of your hardness tester when you check it regularly with CLARK standard test blocks. Clark test blocks, in various hardness grades, provide a quick, sure, and simple method of assuring accurate hardness tester readings.



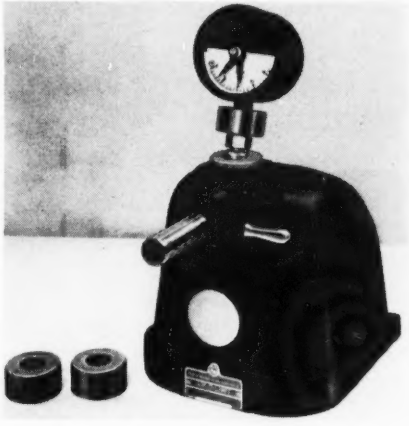
Known as the "Duracut," a 1/8-inch thick flexible abrasive disc which is claimed to provide for unusually long life, together with a fast sustained rate to cut, will be on display in Booth No. 996 by Bay State Abrasive Products Co., Westboro, Mass. Said to resist tearing, the disc is available in 7 and 9-inch diameters in raised hub or flat shapes and in a variety of grits and grades to permit control over the rate of cut and finish.

« »

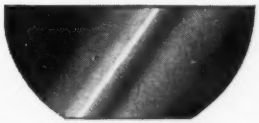
In Booth No. 1042, Production Machine Co., Greenfield, Mass., will display its Type S Centerless Feed Polishing Machine which is said to be ideal for cylindrical polishing or straight-line finishing on flat work, including steel, brass, aluminum, plastics, and other materials. The machine, which has a capacity for cylindrical work from 1/8 to 1 1/2 inches in diameter, features a sheet metal guard; single roll ball bearing platen for heavy cutting; double hardened roll platen for polishing and buffing; means for quickly changing from horizontal to vertical position; centerless, automatic feed; quick adjustment for speed of feed and various diameters; means for quick belt changing; ball bearings throughout; adjustable gage for bevels; flat platen for flat work; automatic take-up for stretch of belt; tracking device for quick tracking of belts; and other details.

« »

Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn., will use two booths to display its products. Booth No. 815 will include a complete line of precision cutting tools and precision gages. Booth No. 632 will feature Kellerflex flexible shaft machines, Keller burs, the new Di-Bur, and the Diaform wheel dressing attachment. Among the many cutting tools on display will be a new line of Keller milling cutters, Hi-helix end mills with cupped ends, and carbide-tipped and solid carbide taps, cutters, and reamers. Also featured will be the new Pratt & Whitney Model F Air-O-Limit Comparator (illustrated herewith) for checking internal and external diameters, straightness, width and length, taper, out-of-roundness, and so on. Another Air-O-Limit gage to be displayed contains the Duplex Indicator—a new Pratt & Whitney development for two-station gage applications. This indicator incorporates two independent gage indicators with individual pointers, thus permitting dual readings on one meter.



WOODRUFF KEYS



We manufacture a complete line of Woodruff keys in all standard sizes. These sizes range from as small as ½" x 1/16" to keys as large as 3½" x ¾". All keys are carefully checked for burrs, slivers, etc. before being shipped to you. Only the finished tested keys are permitted to leave our plants.

We carry a complete stock of high quality, dependable keys. Send for our catalog for complete information on Woodruff keys, taper pins, machine keys, and machine racks.

STANDARD STEEL SPECIALTY COMPANY

BEAVER FALLS PENNSYLVANIA

PLANTS: BEAVER FALLS, PA. • HAMMOND, IND.

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MAGNE-BLOX

SPEED SURFACE GRINDING SET-UPS!

- SAVE YOUR MAGNETIC CHUCKS
- ELIMINATE CLAMPS
- ELIMINATE HOLDING DEVICES

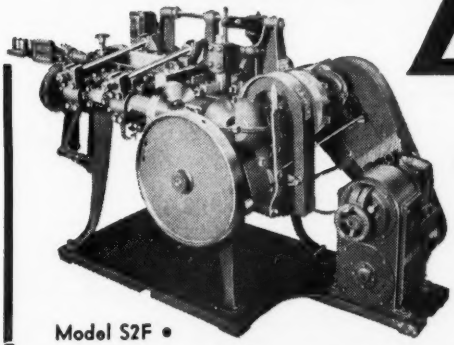
★ GRIND WORK SQUARE...
★ GRIND WORK PARALLEL...
★ HOLD ROUND PIECES...

•EVERY MAN CAN OWN HIS OWN•
WRITE FOR ILLUSTRATED FOLDER

GEORGE SCHERR CO., INC.
COMPLETE LINE OF PRECISION INSTRUMENTS
198-A LAFAYETTE ST. • N.Y.12, N.Y.

See our Exhibit, Tool Engineers' Show, April 10th, Philadelphia—Booth 209

How are things Shaping Up?



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ACCURATE FORMING!

Nilson Automatic Four Slide Machines are adaptable to stamping and forming Wire and Metal coiled stock.

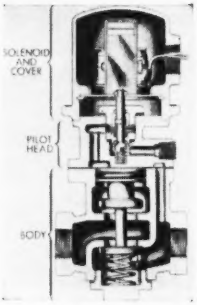
Assures high output of a wide range of small parts at low cost through one-operation production.

The A. H. NILSON MACHINE CO.
BRIDGEPORT 5, CONN.

Automatic Wire and Metal Forming Machines • Staple Forming Machines • Chain Making Machinery • Foot and Power Presses • Wire Reels • Wire Straighteners.

SPECIALISTS IN WIRE FORMING EQUIPMENT FOR OVER 50 YEARS

How combinations of standard Ross valve bodies and heads make possible over 500 different valve applications will be highlighted in Booth No. 139 of Ross Operating Valve Co., Detroit 3, Mich. The accompanying illustration shows how a standard 3-way solenoid-operated valve is composed of three basic units. Both normally-open and normally-closed models are available in sizes from 1/4 to 1 1/4 inches for straightway and 3-way applications. Explosion-proof models will be on display, as well as special modifications for auxiliary push-button operation and for vacuum applications. A new line of solenoid-operated liquid valves has also been developed for low pressure all-liquid operation. In addition to the solenoid-operated air valves, heads are now available to convert these In-Line Full-Flo bodies for use as water-saver valves, time-delay (sequence) valves and master valves.



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Oakite Products, Inc., New York 6, N. Y., will feature recent additions to its line of metal-cleaning and allied materials in Booth No. 565. The exhibit will prominently feature Oakite Compound No. 33, a new acid-type cleaner and surface-conditioner for ferrous metals and aluminum, as well as Oakite Composition No. 38, a recently developed material which forms a dense foam-blanket on pickling solutions to prevent the escape of acid fumes. Other specialized materials highlighting the display will be Oakite Composition No. 91 and 91-A which, when used together, are reported to provide for improved electrocleaning of brass and copper Oakite Composition No. 90, an electrocleaner for steel; Oakite Composition No. 97, an emulsifiable solvent for use in automatic washing machines to preclean steel, cast iron, brass, aluminum and zinc before electroplating or prepaint treatment or between processing operations; Oakite Pickle Control No. 3, a specially designed inhibitor for pickling solutions that prevents waste of acid after scale or rust is dissolved; Oakite Compound No. 36, an acidic cleaner for tank-conditioning of metals for paint; and Oakite CrysCoat No. 87 for economical prepaint conditioning of iron, steel, zinc, aluminum and copper alloys in mechanical washing machines.

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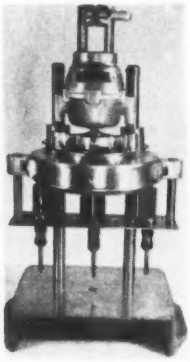

An adjustable multiple spindle head which is said to allow for the drilling and tapping of holes up to and including 5/16 inch in steel on any type of drill press will be shown in operation in Booth No. 732 by Ettco Tool Co., Inc., Brooklyn 6, N. Y. Rapid and accurate spindle adjustments can be made from a minimum center distance of 1 1/16 inches to a maximum center distance of 7⅝ inches. Spindles can also be located at any point within a 3 5/16-inch diameter circle. The head is available with 2, 3, 4, or 5 spindles.

NEW

Shur - Lock Adapters

NO SET-SCREW SLOTS

MICRO NUT LOCKS ANY PLACE ON ADAPTER.

NO THREAD DAMAGE.

ALL SIZES ACME THREADS ½" TO 1⅞".

OLD STYLE STILL CARRIED IN STOCK

New Low Prices.

SEIBERT Quality

Manufactured by

Seibert & Sons, Inc.

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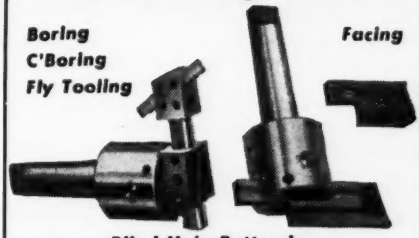
Cut Boring Costs

Boring
C'Boring
Fly Tooling

Facing



Blind Hole Bottoming

Many enthusiastic users report that the Behr Boring Bar actually pays for itself in the first four weeks of operation. Just ask the man who uses one.

This proven, patented bar is chatter proof, extremely accurate and ultra efficient. Has interchangeable blades and accessories.

It is unequalled for versatility and efficiency.

BEPCO

Can you afford *not* to get the facts?

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BEHR PRODUCTS COMPANY WARREN, MICHIGAN

Make A Clean Impression!

HAND-CUT STEEL STAMPS Letters & Figures

Deep, hand-cut letters in special-formula steel assure clean impressions and long service. Face of stamp is angled for extra strength. Chamfered corners for locating the base. Ask for Hoggson Brand at mill supply houses.

HOGGSON BRAND
Since 1849

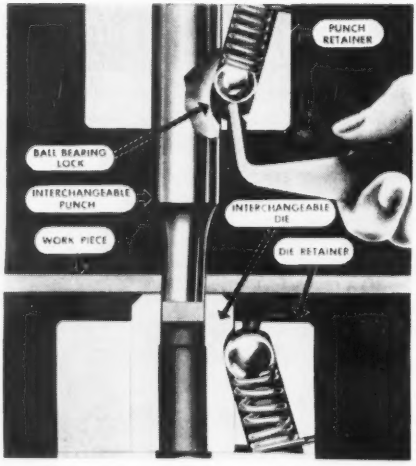
HOGGSON & PETTIS MFG. CO., **New Haven, Conn.**

The E. Horton & Son Co., Windsor Locks, Conn., will feature, in Booth No. 406, lathe chucks having jaws which are hardened by a special flame treatment process. For users of chucks on grinding and other abrasive jobs, the company will display its new "Life Guard" chucks having easily replaceable coverings that seal against oil, water, emery, chips, and so on. The improved Horton Keyless Drill Chuck will be shown in operation on a drill press. Aluminum body chucks with integral steel inserts for the jaw ways will also be on display, along with independent chucks, scroll universal chucks, scroll combination chucks, faceplate and boring mill jaws, two-jaw chucks, and an electric power operated chuck.

« »

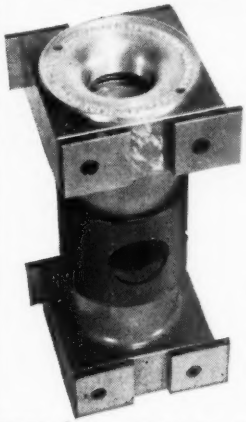
Federal Products Corp., Providence, R. I., will display, in Booths Nos. 305-309, representative models of over 20,000 gages designed by the company. Gages to be shown include dial indicators and attachments; dial indicator or mechanical type gages; dimensional air gages of extremely low maintenance and extreme accuracy; electronic, automatic size sorting gages; continuous measuring gages for flat or round material; automatic machine dimensional control gages; and Electricator (dial indicator and signal light) electrical gages.

« »



R-B Interchangeable Punches and Dies will be featured in Booth No. 665 by Allied Products Corp., Detroit 23, Mich. Demonstrations will be made of the interchangeable feature which permits fast installation and easy removal when punch or die replacement is desired. In addition, the company will exhibit cold forged parts and hardened and precision ground parts.

HORIZONTAL AND VERTICAL SURFACES HELD SQUARE



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Horizontal and vertical level glasses.

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5" x 5" x 12"

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Headless Set Screws

Socket Set Screws

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ANSWERS *ALL* YOUR BANDSAW TIRE PROBLEMS!

THAT'S NOT IDLE TALK BOYS!... THIS IS THE MOST OUTSTANDIN' CHANGE THAT'S HIT THE BANDSAW INDUSTRY SINCE THE CARTER QUICK-CHANGE TIRE WAS INVENTED 20 YEARS AGO!... IMAGINE PUTTIN' ON A BANDSAW TIRE WITHOUT GLUE, CEMENT, RIMS, BOLTS OR SPECIAL TOOLS!

That's right! The new Jiffy-Tires are made in sizes to fit any bandsaw wheel. All you do is tap the wheel into the tire with a soft-surfaced mallet. Applied in less than 5 minutes. Already accepted by America's foremost bandsaw manufacturers as standard equipment.*

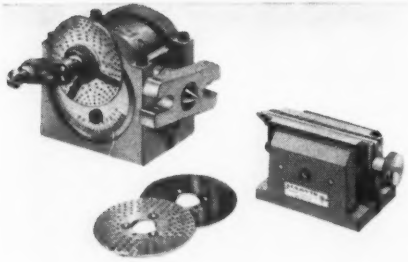
OTHER CARTER PRODUCTS: *Guide Line Lights. *Micro Precision Guides. *Rigid Wheels and Quick-Change Tires

Write today! . . . for your free, illustrated folders on any one or all of Carter's outstanding products.

*Names upon request.

CARTER PRODUCTS COMPANY

960 Michigan Trust Bldg. Grand Rapids 2, Mich.



A new dividing head produced by Marvin Machine Products, Inc., Detroit 26, Mich., will be exhibited in Booth No. 1010. The head, which provides for a wide range in the number of divisions available to meet specific requirements, is designed for dividing operations in layout, squaring shafts, fluting taps, gear cutting, and machining splines, reamers, hex screws, and cams. The head is mounted on two heavy trunnions and has a conventional 40 to 1 worm gear, adjustable for take-up. It can be tilted from 5 degrees below the horizontal axis to 30 degrees past the vertical axis or a total of 125 degrees, and is supplied with 3 index plates having 6 sets of holes each. The tailstock has two pins that align it in a horizontal position with the headstock, and is vertically adjustable for tapered work. A complete line of machine tool attachments, including the Marvin Vertical Mill, Slotter, Rotary Table, and Micrometer Boring Head, will also be shown in operation.

« »

The entire line of Circle R metal cutting saws, products of Circular Tool Co., Inc., Providence, R. I., will be on display in Booth No. 225. Among the saws to be displayed will be metal cutting, slitting and slotting saws and slitting discs; solid carbide and carbide-tipped saws, and other saws ranging from ¼ to 10 inches in high speed steel. Circle R combined drills and countersinks, as well as center reamers, will also be exhibited.

« »

Among the equipment to be displayed in Booth No. 753 by Cadillac Stamp Co., Detroit, Mich., will be the Cadillac "45" Hydraulic Marking Machine for flat, round, and contour marking. Designed to provide marking pressures from practically zero to 12,000 lb. through the use of a single control, the machine features a repeat action and fast slide return of up to 110 one-inch strokes per minute. For convenience and safety, the motor and mechanism are completely enclosed in the streamline housing. The complete hydraulic system is manifold mounted and can be easily removed as a unit for servicing without dismantling the machine. The "Automark" Electric Metal Marking Typewriter and "Automark" Marking Machine will also be shown.

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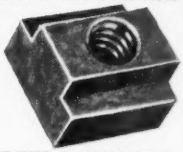

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CUT THREAD STUDS
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For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for trial sample and circular.

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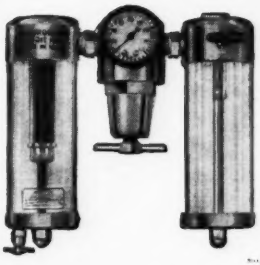
Air Line FILTER, REGULATOR and LUBRICATOR ASSEMBLY



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FILTER element removes solids .00039 and larger. TRANSPARENT BOWL provides visibility. REGULATOR is capable of passing large volume with an unrestricted flow and minimum amount of pressure drop. Self-bleeding, compact, simple. Machined from bar aluminum. LUBRICATOR delivers desired volume of oil. Adjustable Venturi Valve permits efficient operation on broad range of volume and pressure. Bowl can be refilled without shutting off air supply. Any of these 3 devices can be used as separate units or in any combination.

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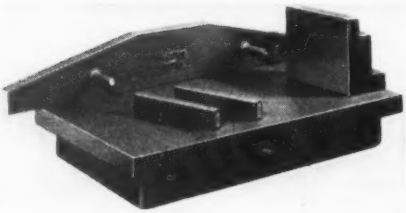
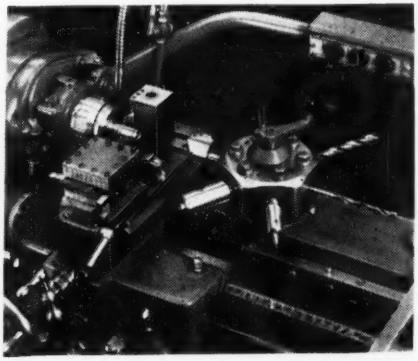


A complete line of basic precision inspection equipment in black granite (diabase) will be exhibited in Booth No. 718 by Rahn Granite Surface Plate Co., Dayton 7, Ohio. The line includes surface plates, angle plates, parallels, and straightedges, all of which are claimed to be held to tolerances of 0.00005 inch.

« »

As a part of its exhibit in Booth No. 923 South Bend Lathe Works, South Bend 22, Ind., will demonstrate its Series 1000 Precision Turret Lathe in operation manufacturing parts for cigarette lighters, which are to be given to visitors as souvenirs. In addition to turret lathes, the company will exhibit toolroom and quick-change gear lathes ranging from 9 to 16-inch swing, 14-inch drill presses, and a 7-inch bench shaper.



« »

Magnaflux Corp., Chicago 31, Ill., will show, in Booth No. 563, three major inspection tools in operation. The Magnaflux Type KDN Unit (illustrated) equipped with Magnaglo will be the featured piece of equipment. Particularly recommended for process control in forge plants, foundries, tool shops, or manufacturing plants, this unit is completely self-contained, requiring only plugging into a 220-volt line for operation and the inspection of parts up to 54 inches long. A Zyglo Type ZA-21 Unit will be in operation as regularly used in the tool crib to find cracked carbide tools and in foundry control on non-magnetic castings. The Magnaflux Sonizon will also be demonstrated as it is used to locate core shift in castings or lack of bond in bearings or for critical wall thickness measure from one side.

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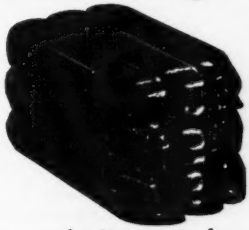
Why THOR STAMPS Last Longer



. . . because they're made of a special, correctly-heated alloy steel. Central striking point assures uniform marking. Thumb side marking assures easy use.

You get more mark per dollar with THOR STAMPS. Write for catalog and prices.

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TAKE THIS *Short-Cut* TO SPINDLE ALIGNMENT!

On tapping and reaming jobs, aligning the work with the spindle can be a tedious operation if you go at it in the old-fashioned way, using a conventional tool holder.

Why not take a short-cut and use a Ziegler Floating Tool Holder? With it you can make a set-up in a fraction of the time because it automatically compensates for inaccuracies up to 1/32" radius or 1/16" diameter.

Thousands have proved this to their own satisfaction over a long period of years. Why not try it and see!

Types to fit any machine used for tapping or reaming

Ziegler ROLLER DRIVE **FLOATING HOLDER** for Taps and Reamers...

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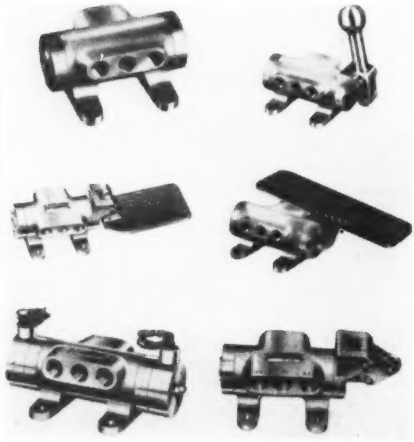
WRITE FOR CATALOG

The complete tooling service available through the Davis Boring Tool Division of Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., will be attractively shown in Booth No. 230. Many important new items will be shown and demonstrated by the engineering and sales staff of the company, including a wide range of super micrometer stud boring tool sets (one illustrated herewith); carbide planer and vertical boring and turning mill tools; high production precision railroad car wheel boring tools; and inserted blade adjustable reamers. The Davis line of standard and special tooling will likewise be shown.

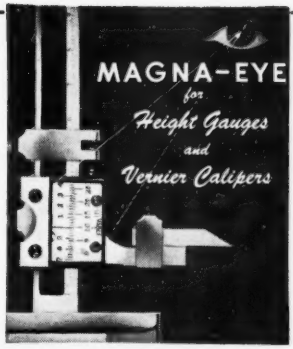
« »

A wide range of Carboloy products now available to industry, including standard tools and blanks, press dies, wheel dressers, a new line of masonry drills, carbide-tipped lathe centers, and so on, will be featured in Booth No. 736 of Carboloy Co., Inc., Detroit 32, Mich. Also on display will be materials and aids offered to industry by Carboloy under its Triple "C" plan for cost-cutting through coordinated carbide control, including six new training film strips on the design, application, and maintenance of carbide-tipped tools.

« »



Modernair Corp., 4222 Hollis St., Oakland 8, Calif., will exhibit, in Booth No. 957, a complete line of air and hydraulic products, including control valves for air and hydraulic circuits; air-operated machine tool feeding units; non-rotating cylinders for air and hydraulic circuits; air presses; air collet closing fixtures; air-operated hydraulic pumping units; and quick exhausting valves.



MAGNIFIES Vernier Scales

The "hard-to-read" Vernier scales on height gages and calipers can NOW be read with ease. No more eye strain, no more guess work, or hit in setting and reading these accurate instruments. • The lens is fine quality optical glass, specially designed and precision ground with utmost optical skill. Four times magnification shows lines true and correct with power to "BREAK" thousandths into "tenths" with ease. In three sizes.

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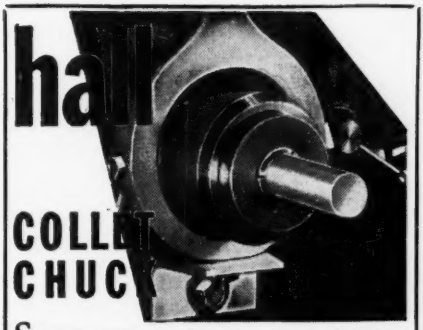

SPEED UP production in multiple operations with push-out type Hall Collet Chuck. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments...no bearings, friction, heat or loss of power. Instant release without stopping lathe.

2-inch capacity, $145; 3-inch capacity, $295; 1-inch capacity, $95

Round, square or hex collets, plain—serrated

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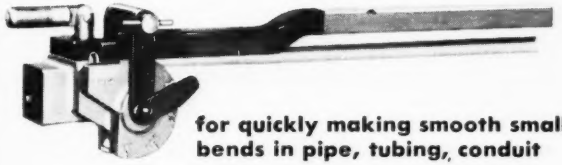
GREENLEE HAND BENDER



for quickly making smooth small-radius bends in pipe, tubing, conduit

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit

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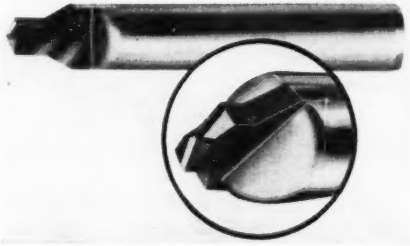
GET FREE FOLDER E-207 AND BOOKLET E-201. Complete facts and prices on the Greenlee Bender line. Write Greenlee Tool Company, 198 Herbert Avenue, Rockford, Illinois.

Nilsson Gage Co., Inc., Poughkeepsie, N. Y., will exhibit, in Booth No. 1151, a new external spline gage having hardened rolls on the upper and lower anvils and a lifting lever which will depress the lower anvil to clear the o.d. of the spline or gear to be checked. This gage is designed to check the pitch diameter of gears having odd or even number of teeth. Also on display will be an internal spline gage which may be readily made from the standard Nilco dial bore gage by removing the centralizing unit. Centralizing is not necessary since the teeth of the spline themselves effect this action. The gaging pin and range extension are then faced with appropriate diameter carbide rolls or balls. In addition, the company will exhibit a complete line of dial bore gages, dial snap gages, groove gages, and A.G.D. standard gages.

« »

A new center drill for hardened steel will be on display in Booth No. 1140 by National Tool Salvage Co., Detroit 10, Mich. The tool was originally developed for use in the company's shop where it was necessary to drill new centers on tools that had been ground off or on which centers were so worn as to be useless.

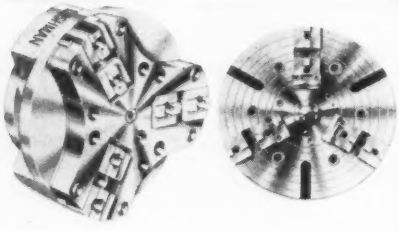


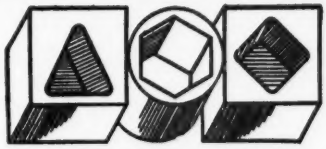
« »

The exhibit in Booth No. 832 of S. B. Whistler & Sons, Inc., Buffalo 17, N. Y., will feature the first public showing of the company's new magnetic perforating dies. Actual perforating die setups will be in production under power so that engineering and plant operating executives may have an opportunity to become informed on all details. Other Whistler developments, including adjustable perforating dies, will also be in use at the exhibit.

« »

In Booth No. 866, Cushman Chuck Co., Hartford 2, Conn., will exhibit, in addition to a comprehensive display of standard chucks, several new products, including a high speed aluminum body air cyclinder for use with power chucks and designed to operate at spindle speeds up to 6,000 r.p.m. Also on display will be a new aluminum body chuck (left illustration) with jaws supported and aligned on hardened steel bearing surfaces for application to machines operated at high speeds. A new power wrench, together with an improved design of scroll chuck, will be demonstrated in operation. This equipment has been specially designed to reduce loading and unloading time and operator fatigue on single spindle machines, and may be used on both bar and chuck work. The company will also exhibit a compensating 3-jaw power chuck (right illustration) for irregular parts.





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South Bend—Formrite Tool Co., 1311 W. Indiana Ave.
Philadelphia—Jack K. Smith, 1200 Commercial Trust Bldg.
Moline — L. R. Christiansen Co., 617 15th Street.
Milwaukee — Redi Products Co., 211 South 2nd St.

MEMBER

"There is no economic substitute for diamonds."

Wilton Tool Mfg. Co., Chicago 14, Ill., will demonstrate, in Booth No. 550, its "Power-arm" work positioning device which, when clamped or bolted to a bench, is said to support a load up to 150 lb. in any position. Other products to be shown and demonstrated will be the Wilton Precision Vise and a new line of C-clamps.

« »

Through the use of displays and actual demonstration, Erickson Tools Division, Cleveland, Ohio, will stress in Booth No. 240, the cost-saving possibilities of new and improved tools in its line. A new lever type air cylinder will be demonstrated under actual operating conditions on the spindle of a turret lathe. Donut design allows work to be passed through the cylinder. Also shown on reaming and tapping operations will be a full floating holder which corrects for both parallel and angular misalignment. Moreover, the Speed Indexer will be in operation on a milling machine, demonstrating unique automatic, positive-locking indexing for milling or machining operations. Also on display will be the new larger size (600 Series) indexer connected to show operation. In addition, the exhibit will include a display of collet chucks, expanding mandrels, lever type air speed chucks, and other equipment.

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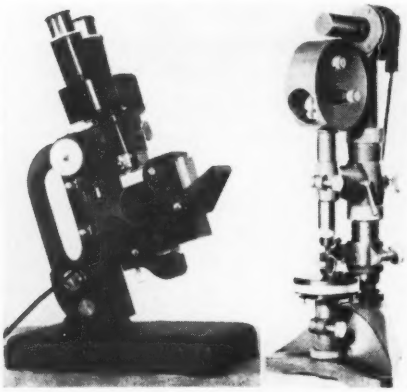
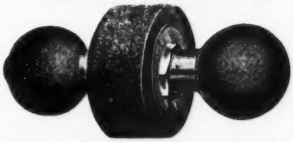


Among the precision inspection instruments to be displayed in Booth No. 209 by George Scherr Co., Inc., New York 12, N. Y., will be the new Leitz Comparison Microscope and Leitz Opti-Comparator. The Leitz Comparison Microscope (left illustration) is intended for examining or comparing machined surfaces for quality of finish. A sample piece or master having the approved finish is placed on one stage while the workpiece is placed under the objectives below. Both images appear alongside each other without any separation, making possible accurate comparison. The Leitz Opti-Comparator (right illustration) is an optical comparator gage which is set to zero by precision gage blocks. A beam of light is used to amplify movement of the feeler point with accuracy of 10 millionths of an inch.

METCALF WHEEL DRESSERS

PRICE $6.50 COMPLETE



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The FLEXLOC is one-piece, all-metal . . . has ample tensile and long life. It is a Stop and Lock-Nut that can be reused many times. Its "chuck-like," resilient locking segments lock the FLEXLOC securely in any position on a threaded member. It positively "won't shake loose," yet can be removed easily with a wrench.

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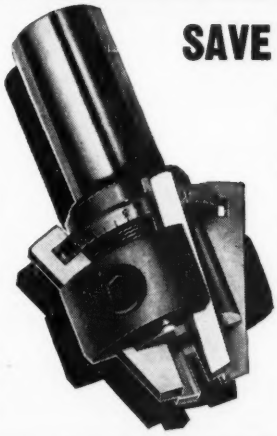

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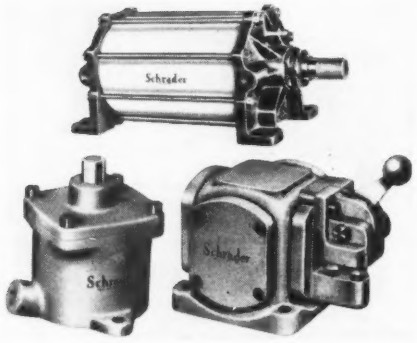
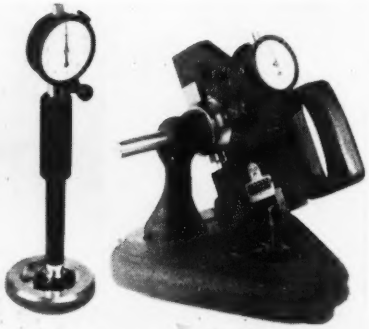


In addition to operating displays of air ejection sets, pneumatic controls for power presses and kick presses, and action demonstrations of blow guns, couplers, pressure regulators, cylinders, and various types of valves, A. Schrader's Son, Brooklyn, N. Y., will introduce a large number of new and improved products in Booth No. 752, including an entirely new series of single and double-acting cylinders (see upper illustration) in diameters up to 8 inches, in any stroke, and in four types of mountings—bolt, flush, leg, and base. Another new product to be shown is the Schrader Air Clamp (lower left illustration), a small push power air cylinder with spring return which is available in two models—base mounted and leg mounted—in strokes from 1 to 2 inches, and cylinder diameters of 1, 2¼ and 3 inches. There will also be displayed a new, completely automatic quick exhaust valve for exhausting air cylinders fast without building up back pressure. In addition, the exhibit will include five new sliding seal valves; a new four-way hand valve of the diaphragm type (lower right illustration), designed principally for use with double-acting cylinders; two and three-way pilot valves available with or without timers in ¾ and 1¼-inch N.P. thread sizes; a new cutout valve for use in any system where a fixed quantity of air is to be passed on each cycle; a new air exhaust muffler; a new automatic air line lubricator and air line filter; new rotating pressure joints for transferring air from a stationary to a rotating member; the Schrader Hydrodial Gauge; the new Schrader Hand Ferrule Contracting Tool for making on-the-spot repairs to air (or water) hose; and other new products.

« »

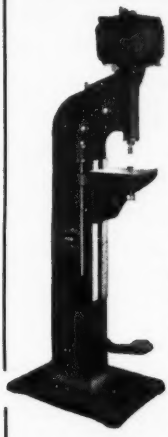
Available in six sizes covering a range of ⅝ to 12 inches, a dial bore gage with indicator having graduations of 0.0001 inch will be featured in Booth No. 1151 by Nilsson Gage Co., Inc., Poughkeepsie, N. Y. The gage employs a three-point alignment and two-point gaging principle which permits direct settings to be made to gage blocks for short runs or occasional set-up jobs without the need for master rings. Wear on the contact point can be compensated for by an adjustment on the dial. The indicator reflects bellmouth condition, out-of-roundness, taper, and size of bores. Also to be exhibited is a dial snap gage which features a framework machined from rolled magnesium with angles at 45 degrees to provide rigidity and to minimize dimensional changes caused by variations in temperature fluctuations. The gage also features a vernier type adjusting screw which permits ¼-inch adjustments to be made in the gaging pin or movable anvil. The adjustment can be locked, with the gage pin still remaining free for checking.



RIVETING?

for

FAST RIVETING
WITHOUT NOISE



Put your production jobs on Linley Spinner Type Riveting Machines. No hammering! They spin rivet with twin rollers. In most cases the actual riveting time is one second per rivet, so that you can watch costs come down while noise is entirely eliminated! Direct Motor or Vee-Belt Driven. Bench or floor types.

Send samples of your work for free riveting, cost of equipment and true estimate on production.

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671 STATE ST. EXT. BRIDGEPORT 1, CONN.

"OLIVER" 36-INCH METAL-CUTTING BAND SAW

Has low speed geared head direct connected to lower wheel for cutting light and heavy sections of metal.

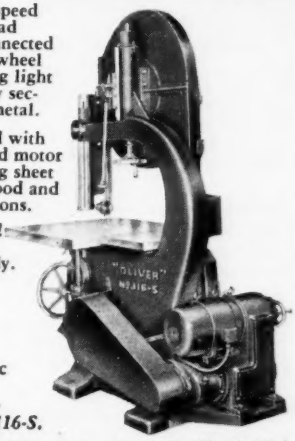
Furnished with high-speed motor for sawing sheet metal, wood and compositions.

Powerful! Cuts true and steady.

Quick-change rim and tire.

Automatic brakes.

Write for Bulletin 116-S.



Oliver Machinery Co., Grand Rapids 2, Mich.

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BOOTH 902
A.S.T.E. EXPOSITION **PHILADELPHIA**

7 SIZES
5 - 85 Ton
Rated Capacity
See this complete line!

PRESS-RITE POWER PRESSES

NOW SEE THEM . . . your big opportunity to see and check the features that make Press-Rite Presses preferred in industry.

- **NON-REPEAT Single stroke safety mechanism.**
- **AUTOMATIC cam actuated brake.**
- **4 POINT Contact sliding key clutch.**
- **HEAVY DUTY uni-cast frame.**

. . . and many other outstanding features.

ALSO TO BE SHOWN—SHAPE-RITE 8" Heavy Duty Shapers and KELLER Power Hack Saws.

NEW . . .
No. 85 PRESS-RITE Power Press
TO BE INTRODUCED
DON'T MISS IT!

Sales Service Machine Tool Co.

2363 UNIVERSITY AVENUE
ST. PAUL 4, MINNESOTA

Republic Gage Co., Detroit 21, Mich., has added to its line a titanium solid ring thread gage, known as the "Titan," which will be shown in Booth No. 947. The ring is of the insert type with knurled aluminum collar. The material in the ring is lightweight but durable and also has inherent self-lubricating properties. The ring is said to provide a completely functional method of checking male threads, with gage wear reduced to a negligible amount.

« »

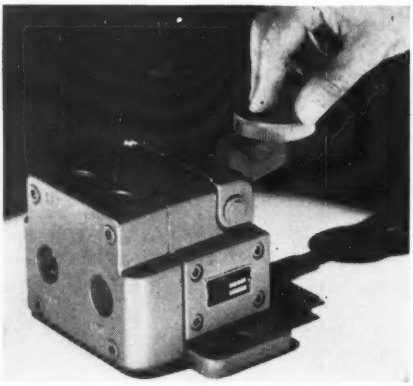
"Lusol," a new coolant that is said to provide for long tool life together with the use of high machine speeds, will be exhibited in Booth No. 422 by F. E. Anderson Oil Co., Portland, Conn. Included will be case history material on the coolant, which is described as a clear bland water soluble solution that does not cause skin irritation.

« »

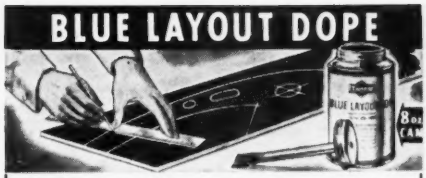
The Producto Machine Co., Bridgeport, Conn., will exhibit its tool and diemakers' line of tools and accessories in Booth No. 1065. Included will be a 50-ton shearing and tryout press, precision machine vises of several types, universal hand tapper, and die set separating machine. In addition, the new Producto Automatic Punch Press Feed will be shown in operation. Designed to provide for fast, economical operation, this feed can be readily adapted to any ordinary type of punch press.

« »

A working exhibit of a complete line of directional air control valves for users of compressed air operated equipment will be a feature of the display in Booth No. 215 of Hannifin Corp., Chicago 24, Ill. These valves will include the recently announced Type NH (hand operated) and Type NF (foot operated) valves (hand-operated valve shown) embodying pilot controlled, piston operated disc type design; the new Type NE "Directair" push-button controlled electric valve; the Type P-25 hand operated valve; and the Type MK manifold valve. Each of these five types of valves will be connected to separate Hannifin air cylinders of identical bore and stroke. Also included as a working part of the exhibit will be the new Hannifin "Micrometric" speed control valve for air cylinders and the new Hannifin "Air Warden" air conditioning unit consisting of filter, pressure regulator, and lubricator for use on all kinds of air operated equipment. Besides the valve and cylinder exhibit, Hannifin will have on display its newest, small, air-operated press, the ½-ton-Han-D-Press (Model M-1), set up for actual operation with one of the new Type NF foot valves. In the field of hydraulic equipment, Hannifin will exhibit a number of models of its improved hydraulic cylinders.



BLUE LAYOUT DOPE



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Durable • Accurate • Economical

The inherent hardness and durability of granite accurately finished to a guaranteed tolerance o .00005", provide the most efficient and economical surface plates for precision measurement operations. Sizes up to 8' x 16'.

★ *Non-Magnetic* ★ *Can Not Warp*
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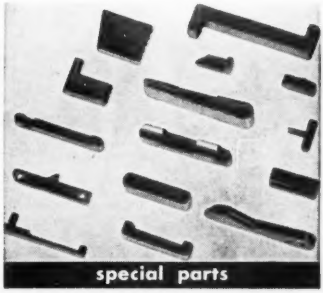

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For 30 years we have specialized in the manufacture of machine parts requiring special milling, drilling, tapping, heat-treating and surface grinding operations. Parts made to your own specifications from any metal to close tolerances. Also suppliers of machine and Woodruff keys, groove and taper pins.

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NEW STAR molyflex BLADES

MAKE TOUGH, METAL CUTTING JOBS EASY!

Here's the blade that will help you cut costs . . . speed up tough metal cutting jobs. These new "Molyflex" High Speed Hand Hack Saw Blades combine the ability to cut the hardest materials with a toughness and resistance to breakage that is unsurpassed. They're shatter-proof too!

In recent tests, when pitted against eight leading competitive blades in cutting SAE 52100 ball bearing steel . . . STAR'S new "Molyflex" AVERAGED 23.8% MORE METAL CUT than all the leading brands tested!

STAR STEELRITE METAL MARKING CRAYONS

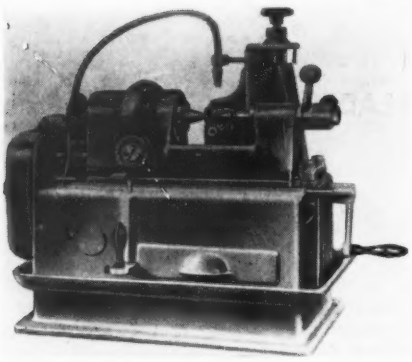
Ask your STAR distributor about these new and improved metal marking crayons. Available in a variety of sizes, these crayons, made of genuine soapstone by special extrusion process, are uniform in strength and composition. Markings can be made on hot, cold, damp or grimy metal and withstand pickling, yet do not affect enamel application.

Get your free copy of STAR'S "Metal Cutting" Booklet and the STAR Wall Chart for your shop! Both are packed full of useful information and will help you get maximum results from hand, band and power hack saw blades.

CLEMSON BROS. INC.

MIDDLETOWN, NEW YORK

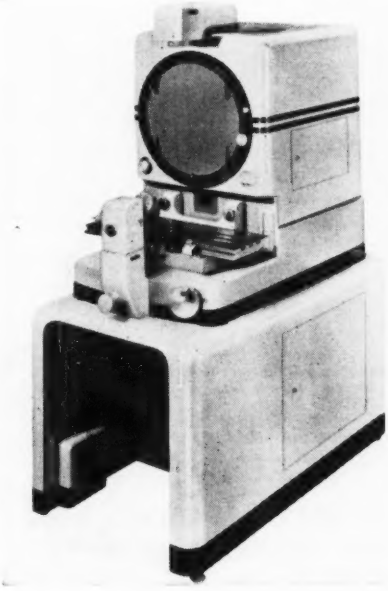
Manufacturers of Hand and Power Hack Saw Blades and Frames, Metal Cutting Band Saw Blades and Clemson Lawn Machines.



In Booth No. 209, George Scherr Co., Inc., New York 12, N. Y., will exhibit the following tools and instruments: Leitz Toolmakers' Microscope with intermediate image; Gaertner Toolmakers' Microscope, 4 x 2-inch capacity with rotary table; Leitz Measuring Microscope, 1 x 2 inches; Leitz Comparison Microscope, to compare surface finish with standard; Leitz Laborlux, a projection microscope for small parts; Leitz Orthometer, an optical comparator for measuring gage blocks and precision parts; Lietz Binocular Microscopes, 3-dimensional; Spencer Binocular Microscopes, 3-dimensional; Leitz Contour Projector, a precision projector for the most exacting requirement; Wilder Projector "A", a micro-projector for the shop and general purpose; Leitz Alignment Telescope for checking alignment of machine beds, locomotive engines, and so on; Parkson Gear Testers for spur, spiral, and bevel gears; Koepfer Gear Hobber for small gears up to 2 inches in diameter; Chesterman Height Gage, 12 to 48 inches; gage blocks, 5 millionths accuracy; and small tools. The Koepfer Automatic Gear Hobber (illustrated herewith) is of the cabinet pedestal type and can be driven from fast and loose pulleys or direct from individual motor. The milling cutter is driven from the main drive by means of exchangeable pulleys. The machine has a maximum milling diameter of 2 inches, minimum milling diameter of 5/64 inch, maximum milling length of 1⅝ inches, maximum diametral pitch of 25.4, and minimum diametral pitch of 169.33.

« »

Known as the Kodak Contour Projector Model 2, a new optical comparator which provides a full 14¾ inches of work space between the lamphouse and lens regardless of magnification will be demonstrated in Booth No. 816 by Eastman Kodak Co., Rochester 4, N. Y. The work table of the new model has been enlarged to 20 inches in length and vertical travel has been increased from 2 to 4 inches. The lamphouse can be swung down to permit surface inspection of long objects which extend far out in front of the instrument. Surface projection is facilitated by a mirror attachment which provides surface or blind hole illumination in any of five planes. A ball-bearing mounted, six-station lens turret permits instant selection of any of six magnifications by turning a handwheel. Lenses available for the turret are made in 10X, 20X, 31.25X, 50X, 62.5X, and 100X magnifications.



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THEY HAD TO BE GOOD TO BE SO FAVORABLY KNOWN FOR SO LONG

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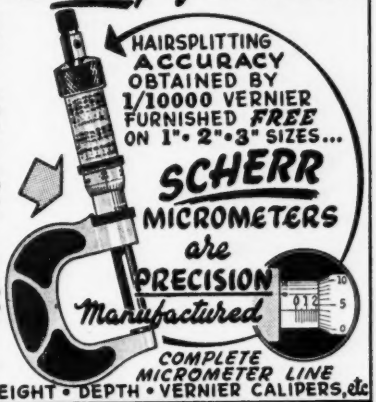
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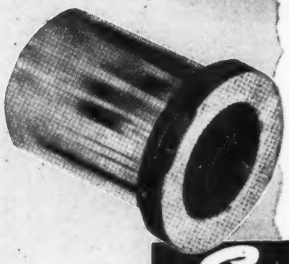
198-A LAFAYETTE ST. • N.Y. 12, N.Y.

See our Exhibit, Tool Engineers' Show, April 10th, Philadelphia—Booth 209

You're a Production Winner with Economy Drill-Jig Bushings and Gages



Yes, they're in stock, ready to go out to you — all A. S. A. standard types and sizes. You can also get fast service on new gages or gages salvaged by hard chromium plating . . . precision-finished, durable. Write for bulletin and price list.

Economy TOOL & MACHINE CO.

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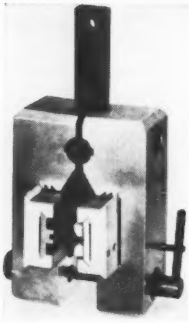


A honing tool for sizing and finishing external diameters will be introduced in Booth No. 531 by Sunnen Products Co., St. Louis 17, Mo. Available in sizes covering a diameter range of 1/8 to 2¾ inches, the tool can be used on metals of all hardnesses and is particularly designed for honing fuel injection plungers, hydraulic pistons and valves, ejector pins for dies, spindles and shafts, arbors, and other parts requiring accurate size and smooth finish. Construction features include a machined aluminum housing, micrometer feed-up, finger-tip control, and steel arm to absorb honing torque.

« »

Norton Co., Worcester, Mass., will feature two of its newer abrasive products in Booths Nos. 409, 411, 413, and 415. To illustrate an unusual tool grinding operation using a 32 Alundum wheel, a 16 x 2-inch face milling cutter will be ground to demonstrate the fast, cool cutting action of Norton's newest abrasive development. In another demonstration, the Company's newly developed cutoff and sanding type wheels of reinforced construction will be shown in operation on portable grinders. A moving display of pertinent booklets on Norton products will be another featured part of the exhibit. Also included in the exhibit will be the recently announced Norton ceramic surface plate, Norbide boron carbide dressing sticks and parts for wear-resistant applications, and a display of Norton grinding wheels.

« »

The Jones & Lamson Machine Co., Springfield, Vt., will exhibit a complete line of optical comparators, automatic opening threading dies, and carbide cutting tools in Booth No. 831. The comparator exhibit will include numerous accessories and fixtures, as well as a comprehensive selection of precision made charts, including radii, grid, protractor, thread and special charts covering a wide range of inspection needs. The die head display will include both radial chaser and tangent chaser types, and a new design chaser grinder.

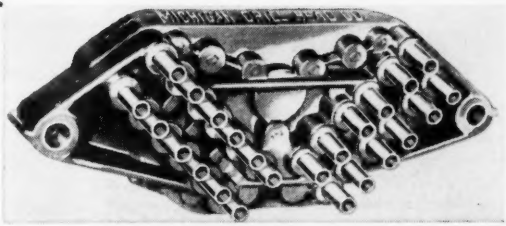
« »

Forged from Timken (S. A. E. 4140) steel, machined to precision dimensions, hardened and drawn in an isothermic quench, a new T-slot bolt featuring a unique head which is said to provide a maximum bearing surface on the T-slot and, in addition, clean the slot as it passes through will be exhibited in Booth No. 546 by F. M. Crayton, Philadelphia 42, Pa. The bolt is available in 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1¼, and 1½-inch diameters and in various lengths from 1 to 30 inches.

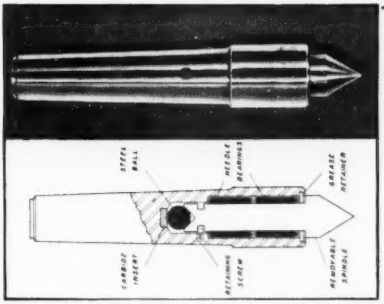
Pictured: a 24-Spindle Heavy-Duty Drill Head.

DESIGNERS AND MANUFACTURERS OF MULTIPLE DRILLING EQUIPMENT.

We Invite Your Inquiry.



MICHIGAN DRILL HEAD CO. 971 E. 8-Mile Road, Hazel Park, Mich.



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1. PRECISION — run-out held to .00015 maximum.
2. SMALL HEAD — permits use on any operation. 30 to 40% less overhang.
3. "PENCIL SHARPENED" PRICE — Nos. 1, 2 and 3—M.T. or straight shank—$15.00. No. 4—$21.00. No. 5—$36.00 with male tips. Request folder.

Distributors: Some territory available

HERBERT CROSS & SON, Bala-Cynwyd, Pa.

Pillow Block BALANCING WAYS

Especially suited for large diameter work, as a sub-base can be made of proper height to give necessary clearance for work. Anderson Pillow Block Balancing Ways are precision built with chilled iron discs which rotate with minimum friction on sensitive special bearings. Many manufacturers have endorsed them for profitable, efficient, static balancing.

ROCKFORD Anderson BROS. MFG. CO. ILLINOIS

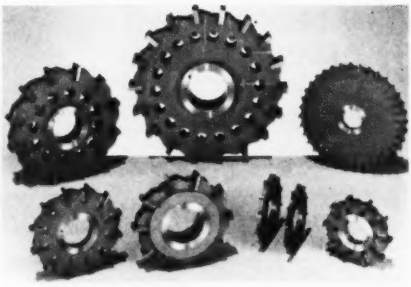
Built in 1000, 2000, 5000, 10,000 and 20,000 Capacities

Write for Bulletin 4-22

ANDERSON BROS. MFG. CO., Rockford, Ill.

Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses.

Lovejoy Tool Co., Inc., Springfield, Vt., will exhibit, in Booth No. 646, a new inserted tooth milling cutter for slotting and side milling. Designated as the Type "S," the cutter features blades which are actually standard carbide blanks and are held in the body with simple taper wedges. The cutter is available in widths from 3/16 to 1 inch and in diameters from 3 to 8 inches.



« »

Armstrong-Blum Mfg. Co., Chicago, Ill., will display, in Booth No. 521, a new modification of its Series 6A and Series 9A "Marvel" Automatic Hack Sawing Machines. This modification combines both full automatic and semi-automatic bar push-up to provide a fully universal machine, equally suited to both full automatic operation for work of normal cutoff lengths and to semi-automatic operations involving long bar movements, such as cutting up stock into lengths of 78 inches and longer which are beyond practical automatic feed-up lengths. The No. 8 "Marvel" Metal Cutting Band Sawing Machine will be shown performing angular work and many other everyday jobs. Also, the No. 4B "Marvel" Standard Duty High Speed Hack Saw and Nos. 1 and 2 "Marvel" Dry Cutting Shop Saws will be in operation. The No. 18 "Marvel" Hydraulic Roll-Stroke Hack Sawing Machine of 18 x 18-inch capacity will be in operation cutting billets and heat-treated die blocks. High-speed-edge hack saw blades and hole saws will be demonstrated in actual performance.

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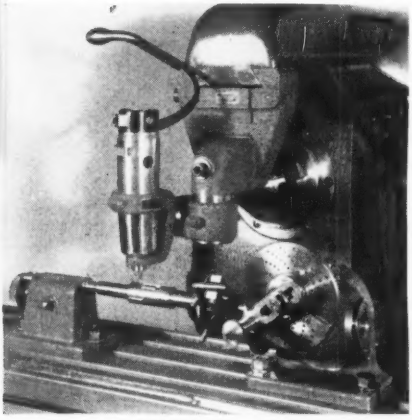

The cost-cutting advantages said to be effected by mounting Precise Grinder-Millers on standard machine tools will be demonstrated in Booth No. 441 of Precise Products Co., Racine, Wis. Equipped with 1/4 h.p. motors and precision quills and collet chucks, these units provide speeds from 20,000 to 45,000 r.p.m. and can be used for internal, external, cylindrical and form grinding; precision milling with high speed steel or tungsten carbide midget mills; sawing; routing; slotting; small diameter drilling and finishing; micro-finishing; and polishing.

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FAST
RUGGED
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HOLDING
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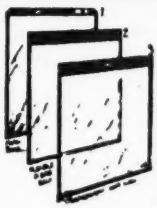

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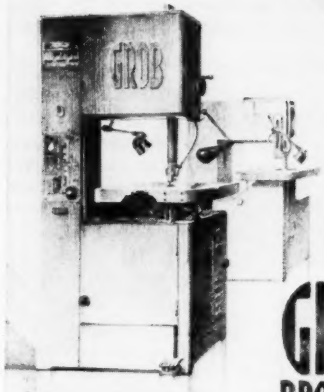
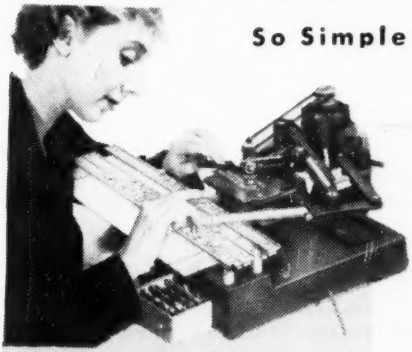


GROB BROTHERS
GRAFTON WISCONSIN



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on Plastic and Metal

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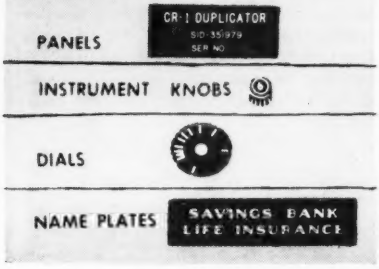


- Multiratio Tracing Arm. Engraves more than 15 sizes from ONE template.
- Covers a larger engraving area than any other portable unit of it's kind.
- Ideal for any lettering.

Send for Booklet Model 1M—Dept. No. 27

NEW HERMES, INC. 13-19 UNIVERSITY PL. NEW YORK 3, N. Y.
World's Largest Manufacturer of Portable Engraving Machines

Ultrasonic instruments for non-destructive testing of tools, steels, and other metals will be featured in Booth No. 13 by Sperry Products, Inc., Danbury, Conn. The display will include the Reflectoscope, an instrument for locating defects in metals by the transmission of ultrasonic vibration, and the Reflectogage, which is used for measurements of thickness from one side of the material only. Associated with the Reflectoscope and Reflectogage in the display will be hydraulic remote controls, self-sealing couplings, and special purpose transformers.

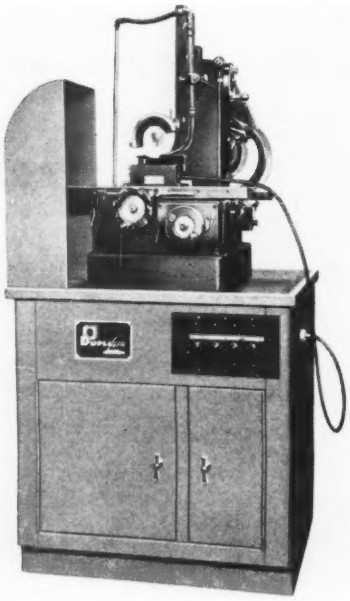
« »

Products to be displayed in Booth No. 836 by The Sheffield Corp., Dayton, Ohio, will include the latest models of measuring instruments and gages. Featured will be newly developed, fully automatic gaging machines designed and built for large automobile manufacturers. The Murchey Division of Sheffield will have an exhibit of die heads and thread chasers. Another portion of the exhibit will be devoted to typical examples of the latest developments in crush-true grinding.

« »

The Charles L. Jarvis Co., Middletown in Connecticut, will display and demonstrate, in Booth No. 807, Multi-Tappers, precision machine-ground tungsten carbide rotary files, solid carbide reamers, solid carbide end mills, solid carbide knurls, and solid carbide boring bits. In addition, there will be a demonstration of flexible shaft machines, Torqomatic tapping attachments, Tecni-taps, and ground-from-the-solid high speed steel and carbide rotary files.

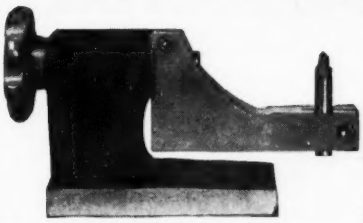
« »



In Booth No. 1122, Airborne Accessories Corp., Hillside 5, N. J., will display the "DU-PLIform," a profile surface grinder especially designed for toolmaking and small parts grinding. The machine incorporates a profiling wheel dresser which permits dressing of the wheel directly from a sample part when grinding either male or female portions of the die, tool, or gage. Means are provided for correcting the form of the profile follower to accurately correspond with the contour of the diamond point regardless of its shape or variation from symmetry. The machine is equipped with hardened and ground ways and is rigidly constructed to allow for the taking of heavy grinding cuts.

"MIGHTY MIDGET" RADIUS DRESSER

PUT ONE ON EVERY SURFACE GRINDER



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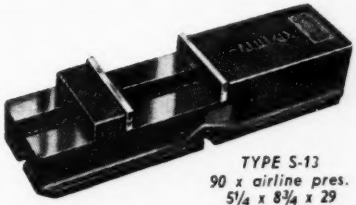

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5¼ x 8¾ x 29
Max. jaw opening 12"

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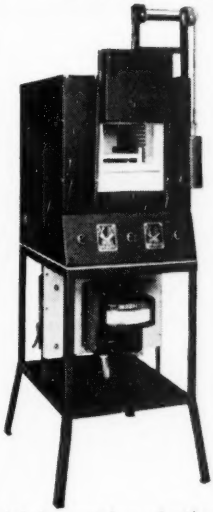

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As Illustrated **$520.00**

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Bench Model also available.

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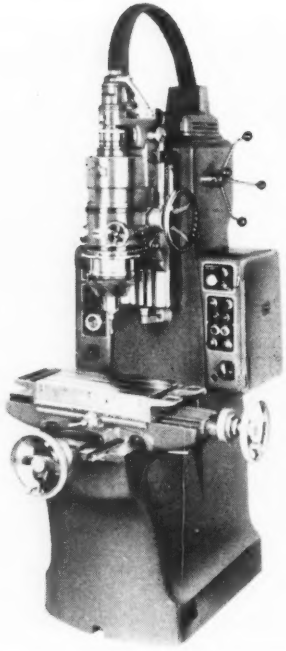
Walker-Turner Division, Kearney & Trecker Corp., Plainfield, N. J., will exhibit, in Booth No. 105, radial saws and drill presses equipped with packaged air power feeds. These automatic air feeds are equipped with controls manufactured by Beckett-Harcum Co., Wilmington, Ohio, and incorporate the new, precision Beckett-engineered Hi-Cyclic Air Valve. When mounted on radial saws, the feeds allow for the automatic cross-cutting of metals and other materials and, when mounted on drill presses, are said to provide for the automatic drilling and tapping of accurate holes without employing a tapping head.

« »

Booth No. 618 of Allegheny Ludlum Steel Corp., Pittsburgh 22, Pa., will be divided between tool steels and Carmet (sintered carbide) alloys. The tool steel section will feature dies made from a new hot work die steel, designated as B-47, as well as a complete range of tool steels, including high speed, cold work, hot work, shock-resisting, and carbon tool steels which are available in bars, forgings, flat rolled (strip, coils and blanks), cast-to-shape, composite drill rod and tool bits. The Carmet section will feature a number of carbide dies used in blanking, forming, and drawing. Panel board displays will show examples of carbide wear parts as applied to practically all types of manufacturing, as well as Carmet-tipped cutting tools.

« »



The new Moore Model No. 2 Jig Grinder for the quick and accurate grinding of any contour, regular or irregular, as well as straight and tapered holes, will be demonstrated in Booth No. 1007 by Moore Special Tool Co., Inc., Bridgeport 7, Conn. A new angular and indexing device built into the main spindle and a newly developed slot grinding attachment are said to permit accurate grinding of any contour. Increased spindle power and infinite feeds up or down allow for chop grinding of contours. Form grinding of die sections is also said to be possible. Grinding speeds range from 12,000 to 60,000 r.p.m. Table size is 10 x 19 inches; table movement, 10½ x 16½ inches.

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Best buys on the market are these all-steel Handnibs: No. 1 shears wide sheets up to 1/8" thick, cuts up to 5/16" round stock; No. 6—with 8" depth throat, punches holes from 1/8" to 1/2" through stock up to 1/8" thick. Ask your Dealer for a demonstration or write for illustrated catalog.

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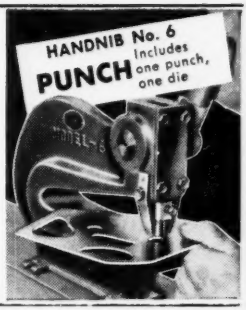
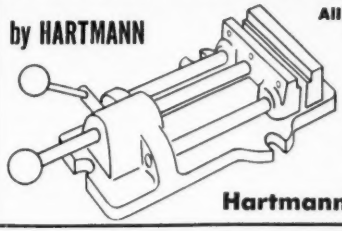


***INSTANT ACTION* RAPIDSET**

by HARTMANN



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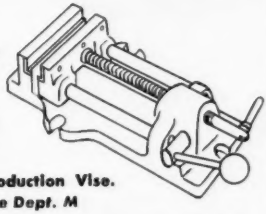

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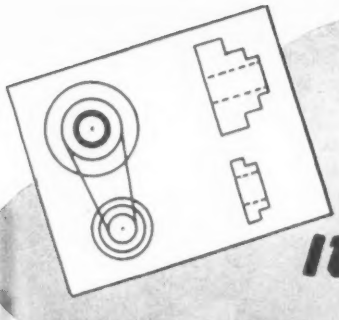


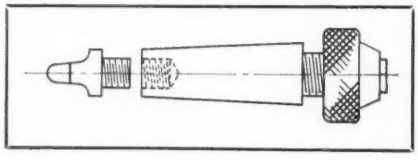
IDEAS FROM READERS

Increased Versatility for Tapered Shank Tools

By H. Landauer

IN many shops, it is standard practice to use tools having tapered shanks, such as end mills, drill chucks, boring heads, collet chucks, and other similar tools, in a variety of different machines such as milling machines, radial drills, horizontal boring machines, and lathes. The spindles of some of these machines are provided with key slots, and therefore it is required that the shanks of the tools used in these machines have tangs in order to obtain positive drives. On other machines, the tools are held by draw rods, and therefore it is required that the tools used in these latter machines have type B shanks, or shanks having threaded holes instead of tangs.

A method is presented herewith to permit the use of any tool on any machine. As may be seen in the accompanying illustration, the tang of a given tool is cut off, and a hole is threaded into the center of the shank at the small end. A high tensile strength steel tang, similar to the one removed and, in addition, having a screw projection, is then made to screw into the tool shank. Thus, depending upon the machine in which it is used, the shank of any tool may be adjusted to have either a tang end or a threaded end in order to provide a positive drive for a given job.



Sketch shows alteration made on a typical tapered shank tool to permit it to be used in different types of machines.

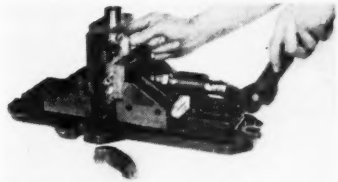
A Method of Adjusting Tool Bits in Small Diameter Boring Bars

By Roger Isetts

THE author has found the method of adjustment shown in the accompanying illustration to be highly effective when it is necessary to back up a tool bit on a small diameter boring bar with an adjusting screw. This type of adjustment is simple to make, and it allows a considerable amount of bearing surface for the tool bit since the adjusting screw does not penetrate too deeply into the boring bar.

A square hole is machined in the

FOR HIGH SPEED PRODUCTION



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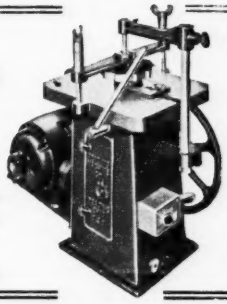

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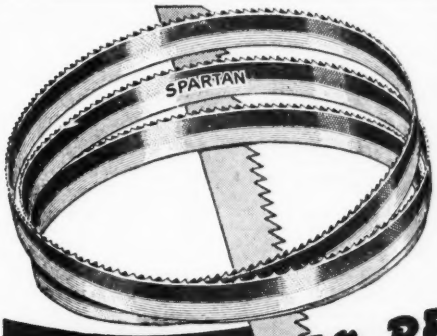

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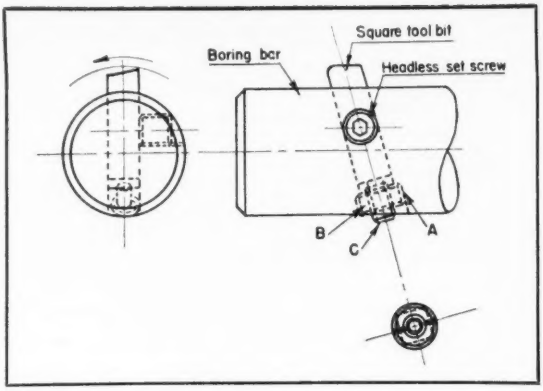
Sketch showing a method of adjusting a tool bit in a small diameter boring bar.



boring bar in the usual manner to accommodate a square tool bit, and the tool bit is held in place by means of a headless set screw. A hole, **A**, is bottom tapped for a short distance along the centerline of the tool bit hole, and a special screw, **B**, is made to fit the tapped hole. The screw is made from a piece of cold rolled round stock; it is threaded on its O.D., and a small hole is tapped in its center through which a dog point set screw, **C**, is threaded. This set screw is used to make the necessary adjustments.

A screw driver slot is milled across the top of special screw **B** so that it may be tightened securely in the boring bar. The headless set screw serves only to hold the tool bit in place; the adjustment provided at the rear of the tool bit takes all of the thrust of the cutting action.

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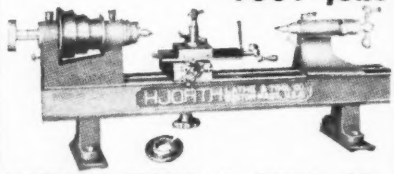

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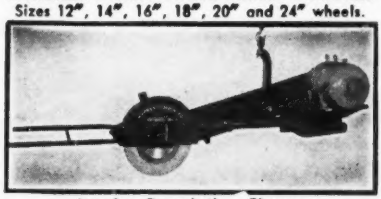

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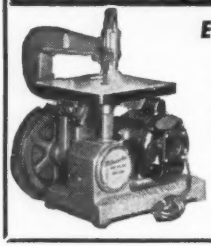

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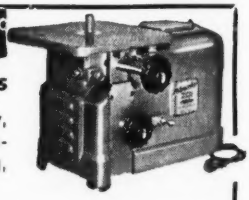

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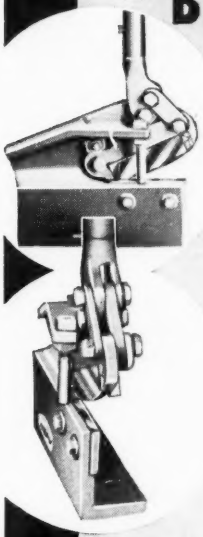

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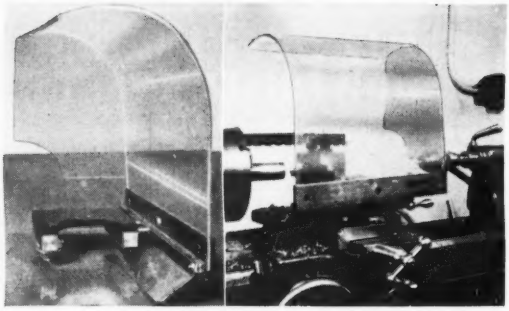

Transparent chip shield for lathes

Transparent Chip Shield

By A. E. FRISTEDT
Sweden

AN easily-made and convenient-to-use chip shield for lathes is shown in the illustration herewith. The shield is made from 5/32-inch Plexiglas which is readily bent to the desired curvature by dipping in boiling hot water for a few minutes and then holding in the bent position until it is cool. After cooling, the material will remain in the bent shape indefinitely.

The shield is fastened to a metal base that is designed to straddle the top slide of the lathe for which it is intended. The base, which is made of sufficiently heavy gauge metal to hold the shield in place, rests loosely on the top slide; no screws or other means are used to fasten it to the slide. Thus, the shield may be easily removed when the workpiece in the lathe is unchucked and a new workpiece inserted. The transparency of the shield allows for complete visibility of the cutting tool and workpiece at all times by the lathe operator.

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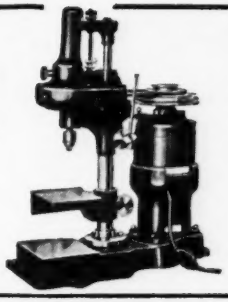

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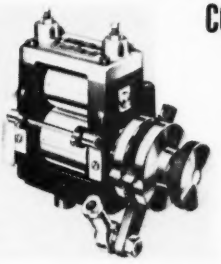

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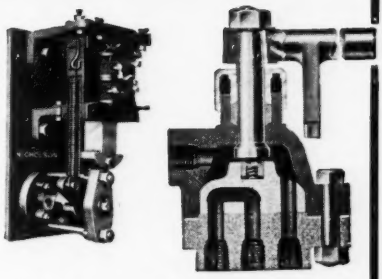

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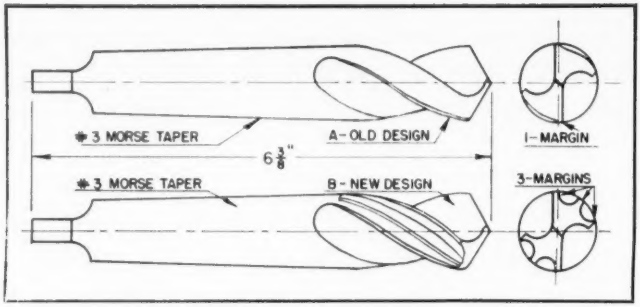

Sketch showing old and new designs of a twist drill.

New Twist Drill Design

By Alex J. Precoda

THE accompanying illustration shows before and after views of a twist drill used on a Baird machine for a severe interrupted drilling job. Holes in the ears of a 1045 steel yoke forging were being drilled; and, with the old type of drill having a single margin per land, shown at **A**, the margins broke down rapidly in service. When grinding the tool to recondition it for use, it was found necessary, in most cases, to cut off the tip of the drill in order to grind it properly.

The drill was redesigned, as shown at **B**, so that there are now three margins per land. Additional bearing surface is obtained with the new type of drill; and so the drill life is increased. Also, the necessity of cutting off the drill tip when regrinding has been almost entirely eliminated. The savings in actual drill usage and in grinding costs due to the redesigned drill amount to about $139 per month.

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CAP SCREWS
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for soldering, brazing

Other useful shop items.

Write for illustrated circular.

BUFFALO DENTAL MANUFACTURING CO.
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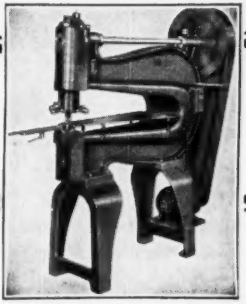
SAVAGE

NIBBLING MACHINE



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For use on all machines with T-slots.

Manufactured and sold by

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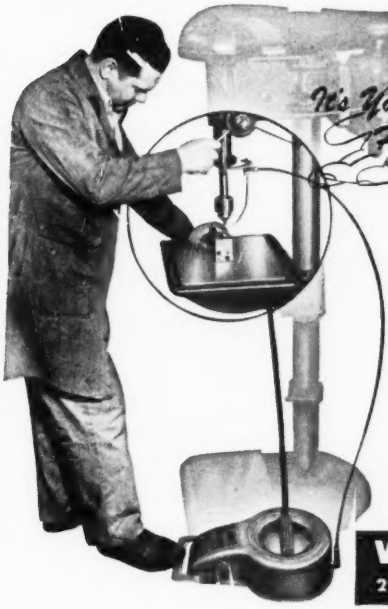
FORT WAYNE 7, INDIANA



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The **Lubri King** UNIT

Puts the Right Amount of Coolant Where, and When, You Want It!

Foot Power Pump eliminates oil cans and brushes . . . delivers as much or as little fluid as you want exactly where and when you want it . . . speeds work by freeing both hands. Easily portable, attaches quickly to any machine.

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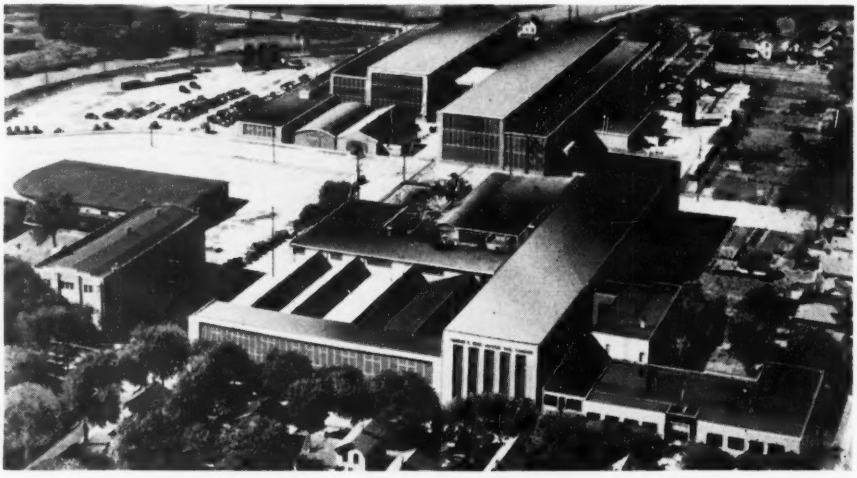
News of the Industry

Cincinnati Planer Company to Be Moved to Plant of Parent Organization

All operations of the Cincinnati Planer Company now functioning at Cincinnati, Ohio, will be moved to Fond du Lac, Wisconsin, and absorbed by the parent organization, the Giddings & Lewis Machine Tool Company. The move to combine operations at Fond du Lac was decided for reasons of reducing general operating costs and to provide more extensive engineering and research facilities. It is anticipated that the move will be completed by July 1, 1950.

R. J. Kraut, president and general manager, emphasized that the Cincinnati Planer Company was in no way being liquidated and plans for moving the complete operations to Fond du Lac, Wisconsin, have been so set up as not to jeopardize sales and delivery of the Planer Company Products. The complete machine tool line regularly manufactured in Cincinnati will now be built in the new and modern buildings especially designed for machine tool manufacturing which were recently acquired by the Giddings & Lewis Machine Tool Company.

The Cincinnati Planer Company was purchased by the Giddings & Lewis Machine Tool Company in July 1948. In July of 1949 the sales and engineering departments of the two companies were consolidated and transferred to Fond du Lac. There will be no change in the directors and executive officers of the Giddings & Lewis Machine Tool Company.



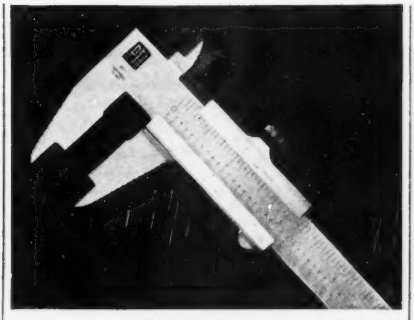
Fond du Lac, Wisconsin, plant of Giddings & Lewis Machine Tool Company and its subsidiary, Cincinnati Planer Company

New home for Hauser Machine Tool Corporation

New Home for Hauser Machine Tool Corporation

The new Manhasset, Long Island, New York home of Hauser Machine Tool Corporation has been completed at 95 Park Avenue. Besides full office facilities, the building houses demonstration showrooms where each piece of machinery equipment not only can be inspected but put into actual use. The private offices, main office, and demonstration rooms were designed under the personal supervision of Carl Hirschmann, president of the company.

Hauser Machine Tool Corporation is the exclusive factory representative in the United States for several precision tool manufacturers of Switzerland, such as Tornos Works Ltd.; Safag Ltd.; Lambert S. A.; Schaublin Ltd.; and Henri Hauser, Ltd. The entire machine tool line of these manufacturers is on demonstration.



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FOR INSIDE, OUTSIDE AND DEPTH MEASUREMENT

An unusual value in a guaranteed, high precision instrument. Of Swiss make, it is equal in quality to the world's best. Made of stainless steel with hardened jaws and blade. Scale 7" long, measures 6". Vernier 1000ths and 64ths. Comes packed in de luxe leatherette case, for only . . .$24. Full satisfaction guaranteed or money refunded after 10-day trial. Order direct (either C.O.D. or remit with order) from

PTI, *Incorporated,* **401 Broadway, Dept. 25, New York 12, N. Y.**

It's Back! **THE LOUISVILLE ELECTRIC LUBRICATOR**

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REDUCE EQUIPMENT MAINTENANCE COSTS

STANDARD EQUIPMENT AC/DC 0-60 CYCLES

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Incorporated
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3M Company Purchases Additional Office and Warehouse Space

The Minnesota Mining & Mfg. Co., St. Paul 6, Minn., has purchased 26,000 square feet of additional office and warehouse space in Detroit, Michigan. Two buildings and nearly four acres of land are included in the property, which is located at 8825 Grinnell Ave.

One structure, containing approximately 22,000 square feet of floor area, will house the Detroit branch sales offices and warehouse facilities, which are being moved from the company's adhesive and coatings plant at 411 Piquette Ave. The smaller building will provide some additional storage space. Both buildings are of steel and brick construction.

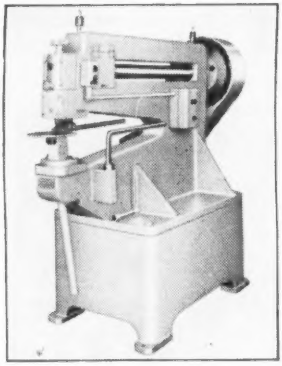
W. F. MacDonald Elected President of E. F. Houghton & Company

William F. MacDonald was elected president of E. F. Houghton & Company, manufacturer of industrial oils, leathers and chemicals, at the annual stockholders' meeting held recently at the company's main offices at 303 W. Lehigh Ave., Philadelphia. Mr. MacDonald, who will temporarily continue to hold also his present office as treasurer, succeeds Major Aaron E. Carpenter, who voluntarily relinquished the presidency and was elected chairman of the board.

Mr. MacDonald, who is 46, was graduated from Wharton School, University of Pennsylvania, in 1927 and entered the employ of Houghton that year as a cost clerk. He has since served as industrial engineer, cerdit manager and treasurer. He was also named assistant to the president in 1946.

One new director was elected by

NIBBLING..New machine cuts odd shapes from sheet stock up to ½ inch



The Campbell Nibbling Machine operates by means of a rapidly moving circular punch over a circular die. The combination of punch and die takes a small "bite" with each stroke of the punch. The cut is made by holding the work against the pilot of the punch and following templet or scribed line. Since the punch and die are round, work can be fed equally well in any direction. The operator may use both hands in guiding the work, which makes it easy to cut intricate shapes. Multiple speed and adjustable stroke provided.

The Campbell line of Nibbling Machines includes 7 models. On the Model 530, ½" steel may be cut from sheets up to 60" wide.

Source: CAMPBELL MACHINE DIVISION
American Chain & Cable
931 Connecticut Avenue
Bridgeport, Conn.

Get Out Those BROKEN TAPS!

Get 'em out quickly with "WALTON" TAP EXTRACTORS, the inexpensive tools for removing broken taps from all kinds of work. Shop proven; fast; economical. See your jobber, or write us for Folder No. 10 and details of free trial offer.

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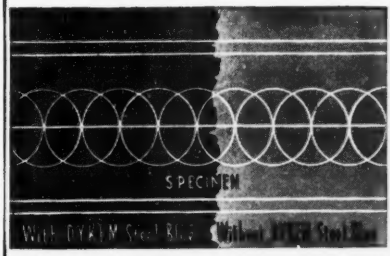


DYKEM STEEL BLUE

Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

THE DYKEM COMPANY

2301F NORTH 11th ST. ST. LOUIS, MO.

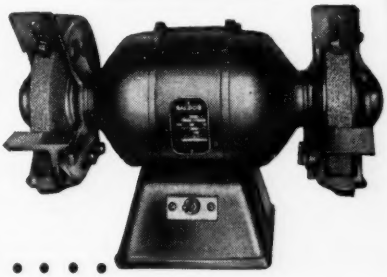
Baldor

RUGGED-BUILT for the long, hard grind

—these Grinders have BALANCED rotors & wheels

BALDOR heavy-duty Grinders are balanced 2 ways: each rotor is dynamically balanced; each wheel is balanced with Baldor's patented flanges. Fully guaranteed. SHOWN HERE: No. 7120, ½ h.p. ball-bearing motor, two 7" wheels (36 grit and 60 grit), fully adjustable tool rests **$60.00**

HEAVY-DUTY TYPE



ASK FOR BULLETIN 321-D

BALDOR ELECTRIC COMPANY

Motors - Grinders - Battery Chargers

4380 Duncan Ave. St. Louis 10, Mo.

the stockholders; namely, Dr. James T. Eaton, manager of research, who has been with the company since 1937. Other directors re-elected by the stockholders were G. W. Pressell, vice president; Dr. R. H. Patch, vice president—operations; D. J. Richards, vice president—sales; E. A. Carpenter, secretary; C. H. Butler; H. B. Fox; and L. D. Holland. Officers re-elected by the board included Charles P. Stocke, assistant secretary, and Miss Marie A. Healey, assistant treasurer.

Ohio State Welding Engineering Conference

The welding engineering department of Ohio State University has announced the completion of the program for the eleventh meeting of the Ohio State Welding Engineering Conference. Some 300 engineers, designers, and production supervisors from Ohio and neighboring states are expected to attend the campus meeting Friday and Saturday, April 14 and 15. This year's conference theme is "Economy in Design and Production."

The first day of the program will be devoted to papers on design for welding. In the evening, the Columbus Section of the American Welding Society will be the host for a dinner meeting. The second day of the program will be centered on production methods.

Downtown headquarters for the conference will be the Fort Hayes Hotel in Columbus, and conference visitors should send their room reservations directly to the hotel. Reservations for the conference can be made by writing to the Department of Welding Engineering, Ohio State University, Columbus 10, O.

How Production-Wise Manufacturers

SAVE SANDING COSTS

FINISHING METAL

This manufacturer of automatic dishwashers, dissatisfied with other abrasives, switched to AP's No. 80 Jewelox Cloth X73. Now reports: "This cloth is the best we've ever used!"

FINISHING PLASTICS

This manufacturer called in AP Engineers on problem of finishing plastic switch plates. Cool-running AP Silver Streak Belts were recommended. Result: Silver Streaks did 25% more work than other belts — eliminated spoilage — cost not a penny more.

Have *you* got a finishing problem? Ask your distributor about AP Jewel Coated Abrasives or write us today!

Abrasive Products, Inc.

SOUTH BRAINTREE 84, MASSACHUSETTS · MAKERS OF JEWEL COATED ABRASIVES

Chief Engineer of Landis Machine Company Granted Patent

The Landis Machine Company has been notified that on January 24, 1950, the United States Patent Office granted Patent No. 2,495,329, covering a centerless thread grinding process, to C. W. Hopkins. Mr. Hopkins, who is chief engineer of the Landis Machine Company, has assigned the patent to the company.

The new patent, which is an improvement on the basic Lloyd patent covering centerless thread grinding which is controlled in North America by the Landis Machine Company, covers exactly the process used by Landis Machine on its centerless thread grinder for both thru-feed and in-feed thread grinding. The process described in the patent has made possible the successful grinding of threads heretofore considered impracticable. For example, threads as coarse as four threads per inch have been ground from the solid bar in one pass.

The Landis Machine Company now holds five patents on centerless thread grinding, in addition to the Lloyd patent, and has other patents pending.

Did You Know?---

The Sentry Company, manufacturer of electric metal heat treating furnaces, has announced the appointment of the Northeast Equipment Company as its Ohio representative. **Harlen F. Mura** and **Albert F. Freiheit** of that firm will maintain offices at 1305 W. 105th St., Cleveland, Ohio.

— o —

Carl A. Day has been appointed head of manufacturing at Bausch & Lomb Optical Co., Rochester, New York.

Precision
+ LOW COST...
M. D. BLOCKS and FIXTURES
STANDARD STEEL BLOCKS
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For years Webber has dedicated itself to the production of gage blocks at a price that even the smallest shop can afford.
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LARGEST EXCLUSIVE MANUFACTURER OF PRECISION GAGE BLOCKS

Did You Know?---

Clipper Diamond Tool Co., Inc., New York, has appointed **Sminkey & Haas,** 2421 W. Pratt Avenue, Chicago 45, Ill., as a distributor.

— o —

Holcroft & Co., Detroit, Mich., manufacturer of production heat-treat furnaces, has announced the appointment of **Wallace F. Schott,** 6516 Detroit Ave., Cleveland 2, Ohio, as its representative in eastern Ohio and western Pennsylvania.

F. J. McNiff, who has been a steel sales executive in the East for over 20 years, has joined Crucible Steel Company of America, New York, as the representative of the stainless steel sales department in the Atlantic seaboard region and metropolitan New York.

— o —

The Bridgeport Brass Company has moved its warehouse facilities from Newark to a new and larger location at Hillside, N. J. The new warehouse will be in charge of **N. H. Mosher,** district manager.

— o —

E. W. Bliss Company has announced the appointment of the **Wegner Machinery Corp.,** 35-41 Eleventh St., Long Island City, N. Y., as exclusive representative for the company's complete line of mechanical and hydraulic presses in southeasten New York State, including metropolitan New York City, the northern half of New Jersey, and northeastern Pennsylvania.

— o —

Greswold Van Dyke has been appointed executive director of Stainless Steel Producers—American Iron and Steel Institute, an organization for further development of uses of stainless steel, made up of a group of seventeen leading producers and suppliers. He will make his headquarters at the American Iron and Steel Institute, 350 Fifth Ave., New York.

— o —

The Taft-Peirce Mfg Co., Woonsocket, R. I., has announced the appointment of **George M. Pearse & Co.,** 1060 Broad St., Newark, N. J., as manufacturers representative in the New Jersey and Metropolitan New York area for its line of gages, gage blocks, small tools, and toolroom and inspection equipment. The Pearse organization will handle sales and services on all Taft-Peirce standard products except machine tools.

MAX-WELL-MADE
E-Z SET
BORING AND FACING TOOLS

- 6 STANDARD SIZES
- INTERCHANGEABLE SHANKS
- TOOL STEEL CONSTRUCTION
- CAPACITIES UP TO 20 INCHES
- BORING BARS UP TO 1½ INCHES
- FINE MICROMETER ADJUSTMENT
- PRICES INCLUDE SHANK AND BARS

WRITE FOR CATALOG NO. 3040

THE MAXWELL CO.
327 BROADWAY • BEDFORD, OHIO

NEW Pioneer Foot Switch SAVES TIME!

Allows machine operators freedom of both hands. Model FS-50 shown is momentary contact type, has BX clamp, is rated 12A-125V or 6A-250V, AC-DC. Other ratings, models available—also special switches made. Send "specs", requirements, for quantity discounts.

Model FS-50 $5.95

PIONEER PATENTS & PRODUCTS CO.
Dept. A, 25 N. Franklin St. Chicago 6, Ill.

Did You Know?---

The Gisholt Machine Co., Madison, Wis., has announced the promotion of two executives in the sales department. **Eugene A. Coombs** has been appointed the new export sales manager and will take up temporary residence in Paris, France. **Robert H. Bruce** is assuming Mr. Coombs' former duties and is now assistant general sales manager.

— o —

Bernard Dolan, formerly manager of merchandising, Peter A. Frasse & Company, Inc., steel distributor, has been appointed manager of sales. In his new position Mr. Dolan will manage sales in the New York, New Jersey, and Connecticut areas and, in addition to his new responsibilities, will continue to direct the company's advertising and sales promotion activities.

— o —

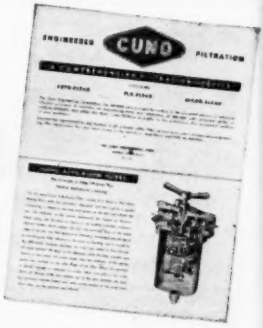
Frank A. Hughes, manager of the sales engineering department of Bay State Abrasive Products Co., Westboro, Mass., died recently at the age of 49. A veteran of World War I, Mr. Hughes was a member of the class of 1922 of Worcester Polytechnic Institute; also, a member of the executive committee of Bay State Abrasive Products Company and American Society of Tool Engineers.

— o —

Carl L. Sadler, Jr., formerly assistant chief engineer of the Hydraulic Division of Sundstrand Machine Tool Co., Rockford, Ill., has been appointed chief engineer of the division.

Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn., has announced the appointment of **Joseph G. Brady** to the position of district sales manager for small tools and gages in the New York territory, succeeding **J. C. Molinar** who became sales manager of small tools and gages. **John R. Batterson, Harry Randall,** and **Denison C. Fuller** have been added to the machine tool sales staff of the P&W New York office, while **Arthur P. Laducer** has been added to the machine tool sales staff of the Chicago office and **P. D. Brown** to the San Francisco and Los Angeles branches.

Get these facts on the one fluid strainer



that will last as long as the equipment it's installed on

For longest service, no replacement, put Cuno AUTO-KLEAN — the only disc-type self-cleaning strainer—on your fluid lines. It's all metal, non-collapsible, *permanent.*

Guaranteed to remove all particles larger than specified.* Continuously-cleanable . . . no need to stop flow. Single unit handles full flow in same space as usual partial-flow type.

Widely used on lubricating, hydraulic, and fuel oils, water, and all industrial fluids.

*Available spacings from .0035 in. to .062 in.

No Fluid Is Better than Its Filtration

CUNO

Fluid Conditioning

Removes More Sizes of Solids from More Types of Fluids

For valuable information on fluid-straining, address Cuno Engineering Corp., 185 South Vine Street, Meriden, Connecticut.

Did You Know?---

The Black & Decker Mfg. Co., Towson 4, Md., manufacturer of portable electric tools, has announced the opening of a new service station and sales office at 1640 N. W. Johnson St., Portland 9, Oregon.

— o —

Hobart Brothers Co., Troy, Ohio, has named the **White Welding Supply Co.**, St. Louis, Mo., as exclusive representative in the sale of Hobart arc welders, electrodes, and accessories for metropolitan St. Louis and the surrounding Missouri and Illinois counties.

Be Specific

Specify **ACE**

DRILL JIG BUSHINGS

AND GET THE BEST

Over One-Half Million in Stock

Write for Catalog 7149 and New Discount Sheet.

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GRAY TURRET HEAD METAL CUTTER OR NIBBLER

N.A.M. Pioneer Award Given to Gray

Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet & Plate Shops.

GRAY MACHINE CO.

Box 596, Philadelphia, Pa.

Roy D. Haworth, Jr. has been appointed manager of product development of the Carbide Alloys Division of Allegheny Ludlum Steel Corporation and will be located at the division's headquarters and plant at Ferndale (Detroit), Michigan.

— o —

Harris Frederic of Frederic & Baker Co., Shreveport, La., has been appointed sales representative for the C. A. Norgren Co., Denver, Colo., and will represent the firm in an area covering parts of Louisiana, Arkansas, and Mississippi, bounded by Little Rock, Ark., Jackson, Miss., Alexandria and Lake Charles, Louisiana.

— o —

Two additional electrical division sales offices have been established by Wagner Electric Corp., St. Louis, Mo. The New Orleans office, a sub-branch of St. Louis sales under the direction of **N. G. Alvis**, is located at 227 International Trade Mart. The Davenport office, located in the Kahl Building, is under the direction of **S. R. Snyder** and is a sub-branch of Chicago.

— o —

Delbert G. Faust has been appointed chief engineer of the C. A. Norgren Co., Denver, Colo., in which capacity he will be in charge of all research and engineering activities in the development of new and improved oil fog lubricators, pressure regulators, air filters, relief valves, and other pneumatic products in the Norgren line.

— o —

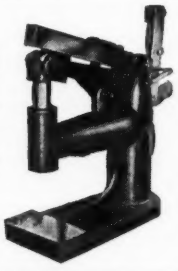
The appointment of **John Lawrence** to the newly created post of technical vice president of SKF Industries, Inc., has been announced by William L. Batt, president of the ball and roller bearing company. Mr. Lawrence will have charge of all manufacturing, engineering and research operations in the firm's plants in Philadelphia and Shippensburg, Pa., and in Hornell, New York.

COLD RIVETERS

and AUTOMATIC STAKING MACHINES

This cold riveter (at right) is made in ten sizes to handle work from 1/64" to 2" diameter. Write for complete information.

For staking, riveting, eyeletting, burring, etc., this high speed staking machine (at left) will produce over 1000 pieces per hour. Adjustable hammer blow, easily and safely operated. *Send Samples for Demonstration Purposes.*



HIGH SPEED HAMMER CO., INC.

307 NORTH ST. ROCHESTER 5, N. Y.

Did You Know?---

G. Earl Jones, for 22 years representative in Michigan for the Lovejoy Tool Co., Inc., Springfield, Vt., died recently of a heart attack at the age of 68.

— o —

As representatives for its steam turbines, The Whiton Machine Co., New London, Conn., has appointed the **W. E. Pearson Co.,** 306 Smith Tower, Seattle, Washington, to cover the State of Washington, and **T. C. Chown, Ltd.,** 1450 St. Catherine St., West of Montreal, Canada, to cover the Dominion of Canada.

— o —

The New Britain-Gridley Division of The New Britain Machine Company has announced the appointment of **Eino Hill** as an additional representative in the Chicago territory. He will complement the duties of **Jack Berry,** who has been the Chicago representative for many years.

— o —

George A. Ingalls, AMF comptroller, and **John W. Herman,** treasurer of the Lukens Steel Co., Coatesville, Pa., have been elected to the board of directors of American Machine & Foundry Co., New York 17, N. Y., according to an announcement made by Morehead Patterson, AMF board chairman.

— o —

C. L. Stocker has assumed sales and engineering responsibiltiies for The Lincoln Electric Company, in the San Francisco area, with headquarters at 1303 Stanford Ave., Emeryville, Calif. The welding engineering staff of the Emeryville office has been recently increased by the addition of **M. F. Yale** and **F. Nichol,** recent engineering graduates. **A. L. Patnik** has been given responsibility for Lincoln welding engineering in the Seattle district, with offices located at 1914 Utah Ave., Seattle, Washington.

John W. Wilkinson has been appointed general sales manager of the McKiernan-Terry Corporation, with plants at Harrison and Dover, N. J., manufacturer of heavy material handling equipment, marine equipment, special machinery, and pile hammers.

— o —

United States Steel Supply Company, a U. S. Steel subsidiary, has been named a distributor of Dimaloy coated tungsten carbide tubes and Dimaloy coated unfilled tubes, new products for electric arc welders manufactured by Industrial Overlay Metals, Incorporated.

YOU PROFIT on every job you send to Rutland!

Rutland reworked or repaired cutting tools are guaranteed to give new tool performance — at a fraction of the new tool cost.

Recutting • repairing • replacing Carbide tips. Special tools from obsolete or standard tools, etc.

Call or Write

Rutland TOOL SERVICE

13006 GREELEY • DETROIT 3, MICH.

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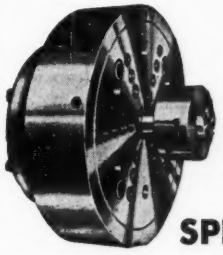

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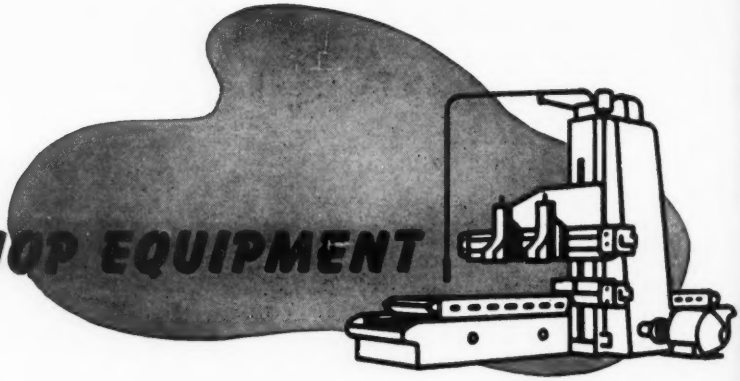
gotten out of the rut and into the groove, by using SPEEDGRIP PRECISION INTERNAL CHUCKS for second operation work? Layouts will be made and prices quoted if prints are submitted. Send for descriptive folder today.

SPEEDGRIP CHUCK, INC. 1102 W. Beardsley Ave. Elkhart, Indiana

NEW SHOP EQUIPMENT



Plain Grinding Machine

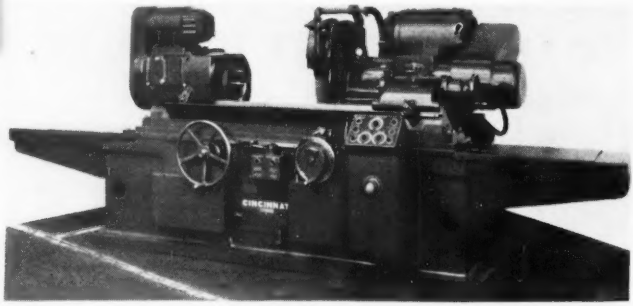
For use in grinding medium to large size parts, Cincinnati Grinders Inc., Cincinnati 9, Ohio, is offering a "Filmatic" plain grinding machine in 14 and 16-inch models. The grinding wheel spindle operates on Filmatic bearings which consist of multiple segments, fixed axially but free to rock radially a slight amount. Immediately upon rotation of the spindle, wedge-shaped oil films are formed between the segments and spindle diameter. The segments build up to high pressures and automatically adjust themselves to variations in forces created by the grinding action.

Lubrication of Filmatic bearings is automatically effected with circlating filtered oil. It precedes spindle rotation and initiates the starting thereof through a pressure switch.

The table is traversed by means of a rack and pinion and a simple drive from the motor. Traverse rates are infinitely variable between 3 and 120 inches per minute through a d.c. motor controlled electronically from a.c. source.

The electrical system for the machine provides automatic acceleration and deceleration of the table at reversal, thereby eliminating shock. In addiiton, tarry at each end of the table stroke can be independently adjusted for a time delay of zero to about 18 seconds. Coolant flow and headstock spindle rotation can be stopped and started independently, or in unison with the table traverse. Table ways, table drive parts, and the rack and pinion are automatically lubricated.

The headstock is a dead spindle, d.c. motor driven unit having a No. 13 B & S taper hole in the spindle. The unit has a bearing on the table approximately equal to the entire length of the headstock casting. Spindle speeds are rheostat controlled, infinitely variable from 40 to 144 r.p.m. for the 14-inch machine and 20 to 72 r.p.m. for the 16-inch machine. Matched V-belts and precision silent chain smoothly transmit power from the motor to the faceplate. A simple and efficient gravity lubricating system at the front of the headstock, incorporating a reservoir with visible level supply and visible rate of flow, protects the running parts.



Cincinnati "Filmatic" 16 x 36-Inch Plain Grinding Machine

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Remember All Starrett Tools Excell

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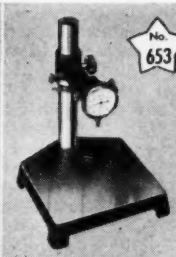
STARRETT PORTABLE HAND DIAL GAGES

With Direct Reading or Balanced Dial

No. 653



STARRETT DIAL COMPARATOR

With Fine Vertical Indicator Adjustment

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With Sliding Table and Fine Adjustment

ALL FOUR WITH STARRETT NO-GLARE "SATIN CHROME" FINISH

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MICROMETER CALIPER

1" Capacity, Tapered Frame, Sycamore Case

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INSIDE MICROMETER

With Solid Rods

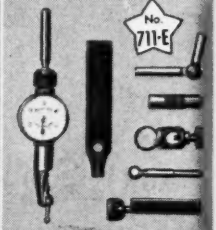
No. 823

INSIDE MICROMETER

With Tubular Rods

A Choice of Two Excellent Inside Micrometers — Two Different Types to Meet Your Requirements

No. 711-E



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With Universal Friction Holder, Universal Shank and many useful attachments

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With Slotted Base Permitting Measurements from Base Surface. Range 0 to 6 inches.

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A Complete Range of Micrometer Depth Gages with 2½, 3, 4 or 5 Inch Bases

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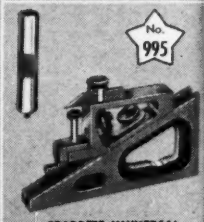

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The footstock bearing on the table is of long design due to an apron extension at each end of the unit. A bellows type dust guard at the projecting end of the footstock spindle is said to effectively exclude dust and grit from this important part. Additional accuracy retaining feature is provided by the sheet metal telescopic way guards at each end of the table which completely enclose the table ways.

All operating elements are within convenient reach of the operator. Electrical control buttons and rheostats are grouped in a panel, plainly labeled for quick reference, near the operator's right hand.

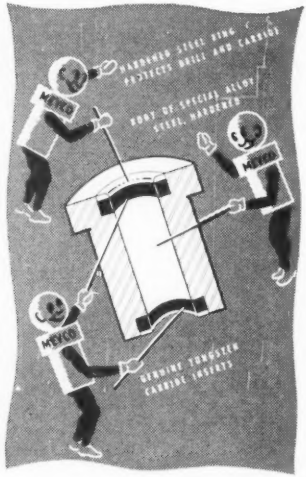
Thirty extra equipment items are available for the Cincinnati Filmatic 14 to 16-Inch Plain Grinding Machines, including automatic wheel balancing; hydraulic profile wheel truing fixtures; swivel table type roll cambering mechanism; and power cross feed to the wheelhead for roll grinding operations and other work.

Universal Wear Tester

Manufactured by Custom Scientific Instruments, Inc., P.O. Box 170, Arlington, N. J., the CSI-Stoll - Quartermaster Universal Wear Tester illustrated herewith is described as a multipurpose and semi-automatic instrument designed for quantitatively measuring resistance to flat abrasion, edge abrasion, and flex abrasion of fabrics, coated fabrics, plastic film, and like materials and the resistance to flat and edge abrasion of felts, laminated fabrics, and solid plastic materials.

For measuring resistance to flat abrasion, a pneumatically controlled rotary specimen clamp is used which has an inflated diaphragm to provide uniform specimen tension and pressure over the area being abraded. The contact pin in the center of the diaphragm provides for the automatic end-point in all types of flat abrasion. The area of abrasion and pressure of the abradant are accurately controlled by the diaphrgm air pres-

THE FIRST NEW IDEA IN DRILL JIG BUSHINGS... SINCE HECTOR WAS A PUP!

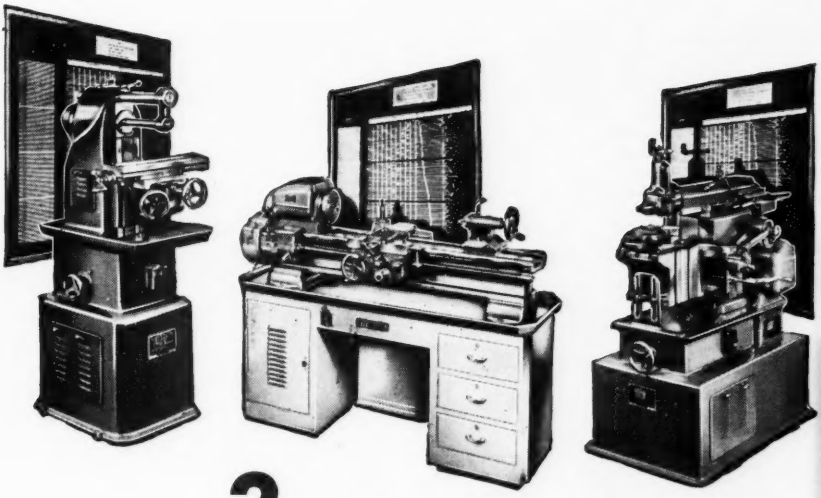

HARDENED STEEL RING PROTECTS SHELL AND CARBIDE
BODY OF SPECIAL ALLOY STEEL, HARDENED
BRAZING TUNGSTEN CARBIDE INSERTS

MEYCO
Carbide Inserted Bushings
SAVE money 7 ways:

Talk about "earning their keep," look at the ways Meyco Carbide Inserted Drill Jig Bushings will save production costs: (1) Last longer . . . with a life—in most cases—as long as solid carbide bushings at prices that come close to the prices of ordinary steel bushings; (2) Increased life for your drill jigs and fixtures; (3) Increased life for your drills and reamers; (4) Accuracy maintained for a LONG PERIOD of time; (5) Less non-productive machine time, less lost man hours, because bushings need not be changed as often; (6) Inspection time saved, because of greater accuracy for a longer time; and (7) Less waste due to spoilage, for the same reason. MOTORMAKER SAYS: "High-Speed steel bushings averaged ten days' life, MEYCO bushings, after three months' use, show no signs of wear."

For information and prices write for Meyco Bushing Catalog No. 16.

W. F. MEYERS CO., INC., BEDFORD, INDIANA



3 Small Machine Tools that cover large production areas

- **Increased collet capacity**
- **More power to cutting point**
- **Zero Precision taper roller bearings — more speed, longer life, extreme accuracy**

Inexpensive to buy, space and power saving, light, fast and easy to operate, these improved SHELDON Machine Tools embody new engineering that gives them *increased capacity for size.** Scientific distribution of mass has given rigidity and stamina without cumbersomeness.

Here is a new development in *profitable production*—a way to obtain more pieces per hour at a lower cost per piece.

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SHELDON

SHELDON MACHINE CO. Inc. 4250 N. KNOX AVENUE CHICAGO 41, ILLINOIS, U.S.A.

sure and adjustable type head weights.

For testing resistance to flexing abrasion, a specimen head is available which also permits fabric-to-fabric abrasion resistance to be determined. To test resistance to edge abrasion, a vertical specimen holder is used which may be clamped in such a manner as to provide for edge abrasion, folding abrasion, and abrasion over a folding plate. Solid materials, such as plastic blocks and laminated fabrics, may also be tested. The direction of abrasion may be unidirectional or multidirectional, depending upon the requirements of the particular specimen as well as the use of cyclic rotation of the rotary head.

CSI-Stoll-Quartermaster Universal Wear Tester

When it's
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.. you'll want
EVEREDE
BORING
HEADS
Two Sizes—2-30 and 4-50
Your inquiries will receive immediate attention
EVEREDE TOOL CO.
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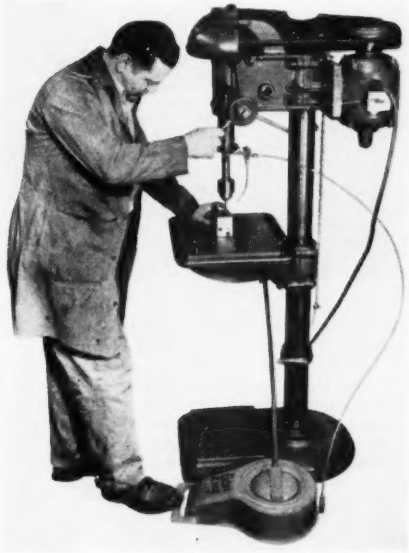
Export Division Ovimpex, Inc.
149 Broadway, New York 6, U.S.A.

Foot-Powered Coolant Unit

Known as the "Lubri-King," a coolant supply unit employing a foot-powered pump for use in connection with drill presses, tapping machines, milling machines, or on a bench has been introduced by the W. A. Horejsi Co., Dept. MMS, 2001 James Ave., N., Minneapolis, Minn. The unit consists of a heavy steel tank holding approximately two gallons of lubricant or coolant and equipped

LUERS
PATENTED CUTTING OFF TOOL HOLDERS
PATENTED CUTTING OFF BLADES
ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.
Manufactured by
J. MILTON LUERS. 12 Pine Street, Mt. Clemens, Mich.
Produced under License Issued by John Milton Luers Patents Inc.

with a foot pump, five feet of plastic hose, and nozzle attachment with bracket that can be quickly attached to practically any machine. The stroke of the foot pedal on the pump controls the amount of fluid delivered to the cutting tool, which can be as little as a few drops or a stream strong enough to wash the chips out of taps, and so on. Where an operation requires a large volume of fluid, the fluid can be returned to the



Drill press equipped with "Lubri-King" Foot-Powered Coolant Unit

tank where it is strained through a 50-mesh screen that is included as standard equipment.

The Lubri-King weighs less than 10 lb. empty, thus enabling it to be easily moved from one machine to another. The tank is made of 20 gauge steel, and the pump, check valves, and fittings are constructed of brass.

Gauge Stop

Known as the "Mule-Gauge," a material stop which is said to have wide application in cutting, shearing, punching, bending, and sawing operations has been introduced by Mahl Equipment Co., Dept.

BE SURE!

And you can be sure of accuracy when you use ACME TOOLS in the Shop, Tool Room or Inspection Department for checking Flats, Angles, or Heights. Made of MEEHANITE METAL, these tools are designed to maintain their rigid precision and give long service even with hard usage.

Surface Plates — Box Parallels
Slotted Angle Plates
Universal Right Angles
Flat Parallels — Lapping Plates

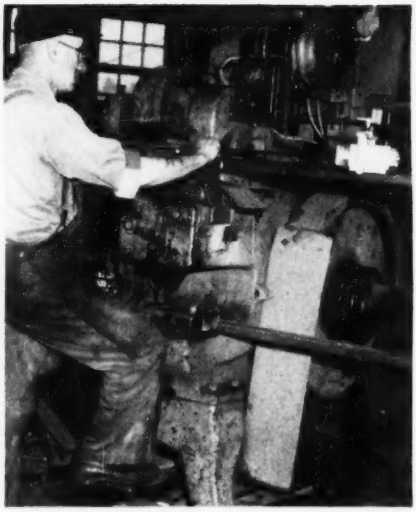
Toolmaker's Knees — Straight Edges
Masterangle Plates
Angle Attachments

SURFACE PLATES RESCRAPED LIKE NEW

ACME TOOL CO.
69 W. Broadway New York 7, N. Y.

MMS, 2930 N. 2nd St., Minneapolis 11, Minn. The outstanding feature of the stop is its shock-absorbing action when heavy iron pieces are thrust against it. The gauge recoils with each cutting or shearing thrust and then returns to its original set position.

The Mule-Gauge is equipped with a compression spring which can be set for heavy or light material and is sufficiently heavy so that it cannot be compressed by shoving material against it. If the workpiece is rammed against it, the gauge is said to push it back to its original setting. According to the manufacturer, the spring "gives" during the shearing action and then returns to its original setting whether one or 1,000 pieces have been cut, thus assuring uniformity.

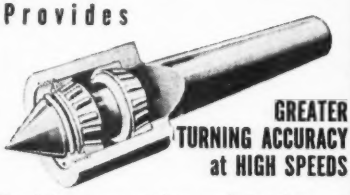


"Mule-Gauge" in use

When used with punches or press brakes where thrust is no problem, the stop, even though it has been clamped into place, can still be adjusted to correct any error or movement in clamping by adjusting a nut at the rear of the gauge. This feature is said to be particularly valuable in punch press work to correct hole location and to even up both sides of the sheet while in the process of bending.

FALLS ROTO CENTER

Provides



GREATER TURNING ACCURACY at HIGH SPEEDS

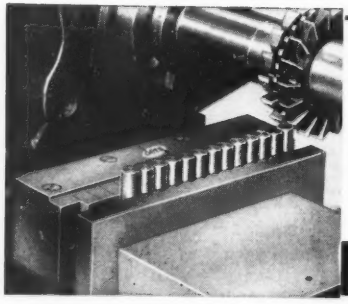
Precision construction and bearing arrangement of Falls Roto Center allows tailstock center to rotate with the work and retain "dead center" accuracy and rigidity.

Two precision quality heavy-duty Roller Bearings, perfectly matched, give smooth, anti-friction rotation at highest speeds. Result is extreme accuracy at maximum production rate.

Write for complete facts in Bulletin MM today.

FALLS PRODUCTS, INC.

124 Genoa St. Genoa, Ill.



GANG VISE JAWS

New • Equalizing • Holds All Lengths, Shapes and Sizes

For faster milling and grinding—the solid Jaw, locked to body, holds a series of equalizing pads with "V" grooves forming a three point holding chuck for each piece of work. Pads and grooves are same width as work diameter.

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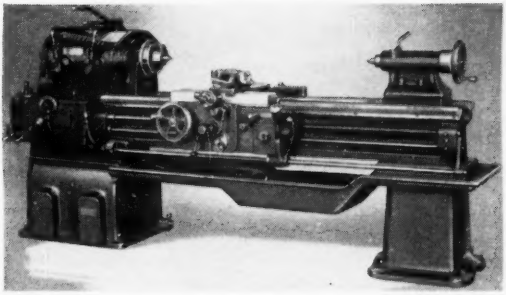


Boye & Emmes Improved 16-Inch Engine Lathe

Additional features of the lathe include a graduated tailstock spindle milled for drill tang; one-shot lubrication to the gearbox and quadrant; anti-friction bearing lead screw box; direct reading dials; chrome plated handles and handwheels; and several other improvements.

Improved Engine Lathe

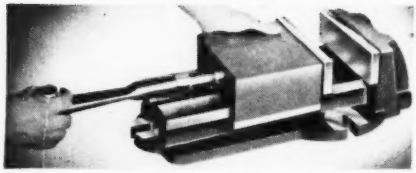
Available in 14 and 16-inch sizes, each having the same features, an improved engine lathe built to operate at spindle speeds up to 1,080 r.p.m. has been brought out by The Boye & Emmes Machine Tool Co., 117 Caldwell Drive, Cincinnati 15, Ohio. The lathe is equipped with an anti-friction bearing headstock, gearbox, apron, and quadrant. The anti-friction bearing gearbox provides for 63 changes of thread, lead, or feed, including 11½ and 27 threads per inch. All gears in this box are of heat-treated alloy steel with shaved teeth.

Floor Mat

Known as the "Evertred," a floor mat which is designed to provide a non-slip surface around machines, at entrances and in other areas of industrial plants has been announced by the American Mat Corp., 1794 Adams St., Toledo 2, Ohio. The mat is constructed of vinyl plastic links woven on a rust-resisting spring steel wire network. One side of each link is slightly corrugated to afford a non-slip surface, while the other side of each link is ridged to provide a mat surface that is said to effect unusually good dirt removal.

Buy a
BOX THAT LASTS!
Sterling "Top Rim" Steel Stacking Box with drop handles—extra support around the box.
Sterling Bin Front "Top Rim" Steel Stacking Box
Sterling Stacking Boxes are designed and constructed to solve your handling problems . . . and save you money. "Top Rim" construction provides stronger support all around the box . . . assures positive stacking. Due to Sterling's method of manufacturing, any size stacking box can be made at standard costs. Other types of shop boxes also available.
Write for literature and prices.
Sterling Factory Equipment Co., 183 Charles St., Providence, R. I.
Sterling
Quality Handling & Storage Equipment

According to the manufacturer, the **Evertred Mat** is 100 per cent greaseproof and will not absorb soil, discolor with use or age, or lose any of its color brilliancy. Produced in widths up to 5 feet and in any desired length, the mat is available with links in any of five brilliant colors—green, red, brown, white and black.



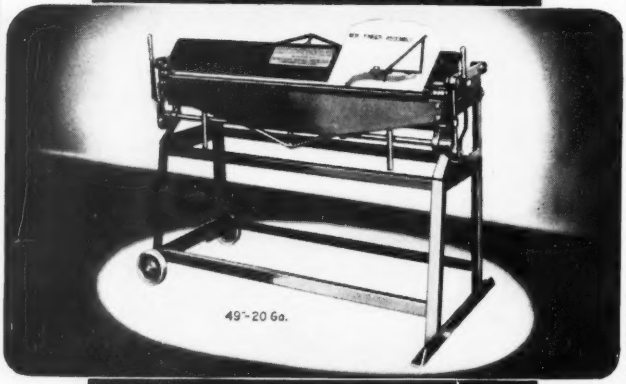
Ames Model 8 Precision Machine Vise

Machine Vise

Identified as the Model 8, a precision machine vise for milling machines, drill presses and shapers has been placed on the market by the Ames Precision Machine Works, Waltham 54, Mass. The vise is provided with 8-inch wide jaws that can be quickly opened a full 11 inches and tightened with a high gripping pressure by turning the operating screw a small amount.

Durably and precisely built for long service, the vise measures 21 inches long overall x 5½ inches high overall and weighs 125 lbs. The jaws and rails for the sliding block are hardened and accurately ground to provide for long life.

WHITNEY METAL
TOOL COMPANY
39 YEARS EXPERIENCE



WHITNEY-JENSEN
49" — 20 Ga.
BENDING BRAKES

Portable or stationary bending brakes that form a 1/2" flange in 20 gauge mild steel their entire length. Made in two styles — for straight bending or for combination box and pan work as well as straight bending. Combination roller bearing bending brakes — in 18 ga. or 16, 14, 12, ga. capacities — are also available.

WHITNEY METAL TOOL COMPANY
110 FORBES STREET, ROCKFORD, ILLINOIS

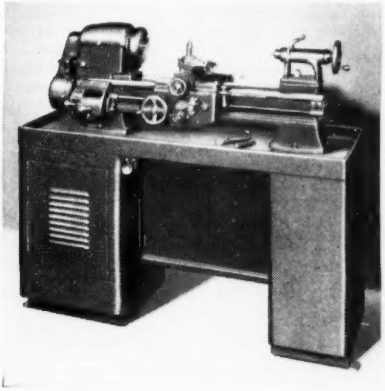
11-Inch Lathe

With 1-inch collet capacity, 11-inch swing, 1⅜-inch spindle hole, and center distance of 24 inches, the Logan No. 955 Lathe illustrated herewith, product of the Logan Engineering Co., 4901 W. Lawrence St., Chicago 30, Ill., is said to have adequate capacity for industrial work, as well as for maintenance shops, toolrooms, and school shops. The ball bearing mounted spindle permits speeds of 45 to 1,500 r.p.m.

without bearing adjustment.

Bed ways are precision ground to within 0.0005 inch of absolute lineal accuracy, and there is said to be less than 0.0005-inch total runout of the spindle 12 inches from the front bearing. The lathe is mounted on a pedestal base with the underneath drive completely enclosed. The compact, trim design of the base, with no protruding parts, permits multiple installations in a small floor area, and conserves space on single installations as well. Another feature of the steel pedestal base is the recessed construction at floor level which permits toe room for the operator and simplifies cleaning. All control parts are conveniently placed at the finger tips of the operator.

The lathe is also available in a similar model having a center distance of 33 inches.



Logan Model No. 955 Lathe

Quick - Shipment on

TAPER ATTACHMENTS

For All Lathes—Old or New—
9" to 24" Swing
Write for Bulletin
MASTER - TAPER COMPANY
4531 N. Beacon St., Chicago 40
Excl. Mfrs. of Taper Attachments

$29.50 to $125.00

FOR *Cost Reduction*

Snow Air-operated, Electrically Controlled Machines and Fixtures

• Single Spindle Verticals • Two-Spindle Verticals • Two-Spindle Horizontals • Automatic Nut Tapping Machines • Drill Press Tap Heads • Automatic & Semi-Automatic Jigs & Fixtures

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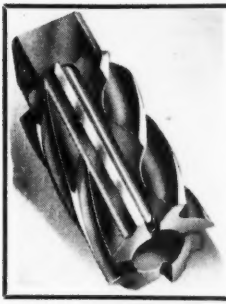


GAMMONS WELDERS' SEATING REAMERS

for replaceable Welding Tips
Duplex Design • ***End Cutting***
Stocked in 4 Sizes
GIVES PERFECT SEAT FOR NEW TIPS
Also Manufacturers of Special Reamers for Electrode Holders

GAMMONS HOAGLUND CO.
MANCHESTER 2, CONN.

A.S.T.E. *Exposition* BOOTH 31

Granite Precision Parallels

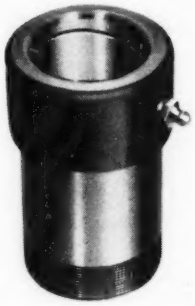
Precision parallels made of black granite to a claimed overall tolerance of 0.00005 inch are now being offered in a set in sizes from ½ x 1 x 6 to 1 x 2 x 12 inches by the Rahn Granite Surface Plate Co., 1149 Platt Circle, Dayton 7, Ohio. The parallels can also be obtained in larger sizes up to 4 x 6 x 30 inches.

Produced by a hand lapping process, the granite parallels, it is stated, maintain their original accuracy indefinitely, will not rust, and do not allow for the imbedding of abrasive particles in their surfaces.

Guide Bushing

Lamina Dies & Tools, Inc., 14925 W. Eleven Mile Rd., Berkley, Mich., is now producing a guide bushing made of hardened steel with 0.001 to 0.002 inch of bronze electroplated on the inside diameter (bearing surface) which is said to provide the long-wearing quality of hardened steel, together with the elimination of scoring or seizing. The bushing is also claimed to eliminate out-of-round and bellmouthed wear.

In addition to the bronze bearing surface, an oil groove, $\frac{1}{32}$ inch wide, is machined into the inside diameter in a double figure eight pattern, and an Alemite fitting is mounted in the collar of the bushing for feeding lubricant to this groove. Said to be ideal for use with production stamping and forming dies, the bushing is manufactured in standard sizes for die guide pins and can also be produced for other guide bushing applications.

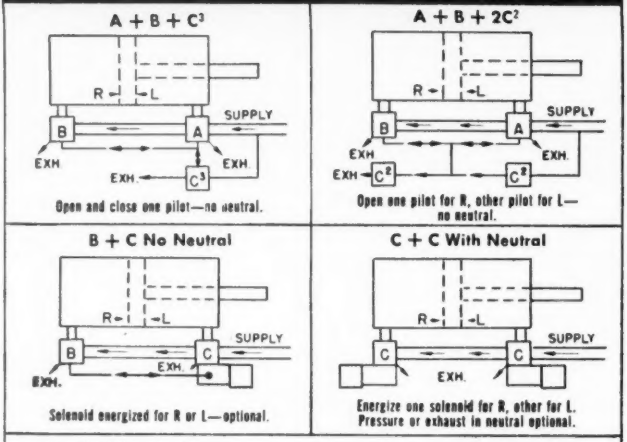


Lamina Guide Bushing

SOLVE AIR PROBLEMS

Easy as A, B, C - -

WITH UNITIZED CONTROL



A = L3A Numatics Valve
B = L3B Numatics Valve
C = SL3 (L3A with solenoid pilot attached)
C² = Two-way pilot valve
C³ = Three-way pilot valve

Shown here are a few typical combinations obtained with "Unitized Control" . . . applied directly to the air cylinder.

INCREASE PRODUCTION —LOWER COSTS

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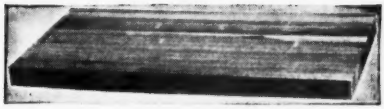
NUMATICS

100 SOUTH MAIN ST. • MILFORD, MICH.

Laminated Bench Top

The Quality Maple Block Co., 2044 First Ave., New York 29, N. Y., is now market-



Quality Laminated Bench Top

ing a laminated top for use in tool and die rooms, inspection, shipping and production departments of industrial plants. Manufactured from 100 per cent hard rock maple and reinforced with steel rods, the top is available in standard sizes from 36 x 24 to 120 x 36 inches in thicknesses of 2, 3, and 4 inches. Special shaped maple surfaces for various machine applications can also be furnished.

Stainless Alloy

Designated as Carpenter Stainless No. 20, a highly corrosion-resistant stainless alloy is now available in the forms of bar stock, wire, strip, tubing, pipe, sheet, and plate from The Carpenter Steel Co., Alloy Tube Division, Union, N. J. Particularly recommended for use in processes where sulphuric and other pickling acids are employed, Carpenter Stainless No. 20 is said to increase the service life of equipment such as pickling tanks, fume ducts, exhaust fan blades, pipe lines, acid circulating systems, and so on. Products such as valves, fittings, fastenings, wire cloth, and weld rod may also be made from the material.

Angle Dresser

Sperman Metal Specialties, 2197 E. 21st St., Brooklyn 29, N. Y., has announced the "Mighty Midget" Angle Dresser which has a Meenhanite iron base for long life with freedom from distortion. The desired angle can be accurately set with a protractor from any of the ground sides, or base, or with a sine bar for special work.

The unit, which has very large bearing surfaces that can be easily reground after years of service, is used underneath the grinding wheel, thus eliminating the

STOP WASTING

SHIM STOCK

Buy it in the Laminated Shim Company's handy dispensing cartons and racks. It's ready for use, with no waste because of inadequate stowage and fumbling with bulky sheets. Just pull the length you want out of package slot and snip it off.

ARBOR SPACERS

in moisture-resistant envelopes

Seven standard sizes, with or without keyway. Eight different thicknesses from .001 to .020 inch.

LAMINATED SHIM COMPANY, Inc.

3304 Union Street Glenbrook, Connecticut

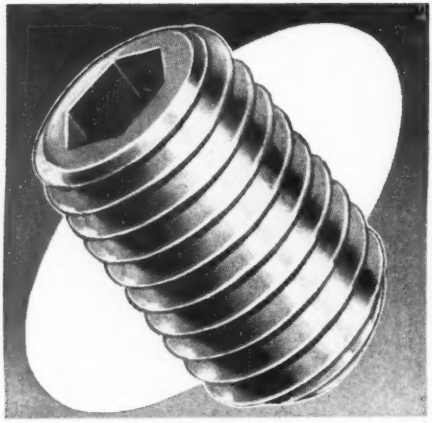
SHIMS SHIM STOCK STAMPINGS AN-COR-LOX NUTS

Quality....

Everybody talks about it

B-RIGHT-ON NU-Process

...really assures it!



New methods, incorporating an entirely new metal-working process, make unvarying top quality a fact, not just a claim with Brighton Socket Screw products. Specially selected alloy steel, meeting Brighton's rigid specifications, is formed by Brighton's Nu-Process into screws with continuous unbroken fibers and fine compact grain. Carefully heat-treated under electronic control every screw has the exact hardness and strength needed.

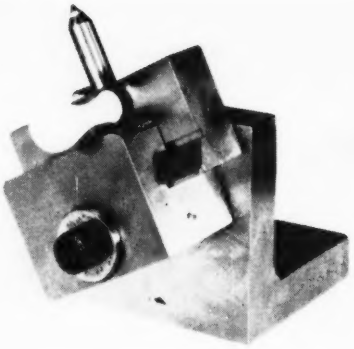
For full details on Brighton Screws, send for your copy of New Catalog.

BRIGHTON

Screw & Mfg. Co.

READING RD. at DORCHESTER

CINCINNATI 2, OHIO

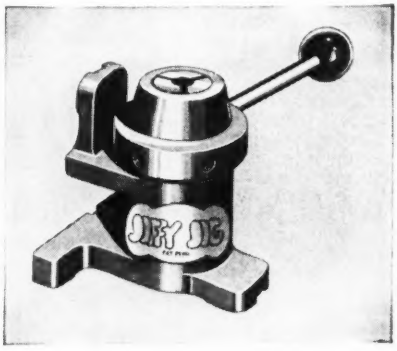


"Mighty Midget" Angle Dresser

necessity of removing the wheel guard. The dresser is provided with a convenient operating handle that is so situated as to keep the hand away from the grinding wheel. The pivot screw has a ball-thrust bearing so that the arm can be tightened with very little pressure and with no danger of shifting the angle.

Work-Holding Fixture

The "Jiffy-Jig," a simple, quick-acting collet type work-holding fixture for secondary operation drilling, milling, tapping, boring and grinding, has been announced by Rigid Products Co., 16 Allen Ave., Cincinnati 15, Ohio. With the fixture, an easy 2-inch movement of the operating handle is said to provide for rigid, accurate work support in either a horizontal or vertical position. A sepa-



Rigid "Jiffy-Jig"

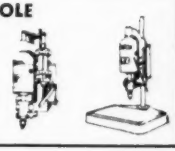
PRECISION DRILLING

.004 to 1/2"

★ Fingertip Variable Speed
★ Sensitive Precision Spindle
★ Quick-set Drill Depth Stop
★ Built-in Ball Bearing Motor
★ 16" Model 300 to 5,000 RPM

Speed-Right Model 601

8" HIGH SPEED SMALL HOLE DRILLING .004-.156"
Speed-Right Manual and air feed drilling machines feature controlled uniform spindle speeds 1000-10,000, 2500-15,000 R.P.M.
Priced from $124 complete.



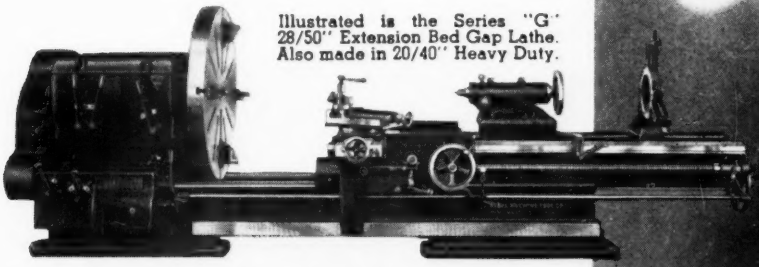
Send for helpful bulletin

THE ELECTRO-MECHANO CO.
265 EAST ERIE STREET
MILWAUKEE 2, WISCONSIN

Extension Bed *Gap Lathes*

The Extension Bed Gap Lathe is designed to be used either as a gap lathe or an engine lathe. We also manufacture a line of regular geared head engine lathes.

Write for circulars.



Illustrated is the Series "G" 28/50" Extension Bed Gap Lathe. Also made in 20/40" Heavy Duty.

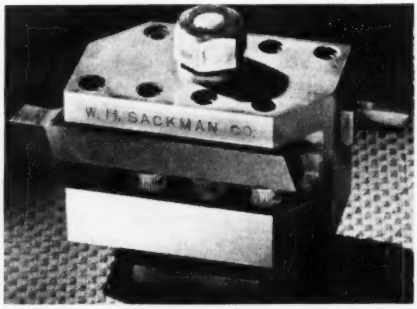
The Nebel [illegible] Tool Co.
CINCINNATI OHIO

rate arm (not illustrated) rigidly supports a drill jig bushing in any desired position with respect to the work for cross-hole drilling.

For rapid operation on production work, an easy-operating spring ejector is available which automatically kicks the work into a pan on release of the collet. An adjustable stop is said to provide for accurate locating of non-shouldered work. Axial motion of the collet in opening and closing is said to be eliminated, thus making accurate control of lengths possible. Collets are available in round sizes from $\frac{1}{16}$ to 1 inch in diameter and in hexagonal sizes up to $\frac{13}{16}$ inch.

Lathe Toolholder

A toolholder for lathes announced by the W. H. Sackman Co., Inc., 44 N. 4th St., Philadelphia 6, Pa., is said to rigidly

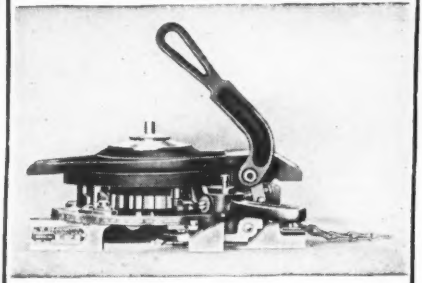


Sackman Lathe Toolholder

hold wide tools on comparatively narrow bases with complete absence of chatter. The holder is designed to accommodate two tools and, by swinging end for end, lathe operations such as threading, forming, cutting-off, and so on, can be performed.

The construction of the toolholder in-

AUTOMATIC CHUCKING AND INDEXING FIXTURE



1.—1800 light cuts per hour.
2.—Either horizontal or vertical position.
3.—Collets changed instantly.
4.—Automatically knocks piece out.
Model D—Ratchet indexing only—1" cap.
Model E—Both degree and ratchet indexing —Capacity up to 1".
Model F—Both degree and ratchet indexing —Capacity up to 2¼".

Write for Folders

J. W. DEARBORN • Ansonia, Conn.

SAVE 90% CHECKING TIME

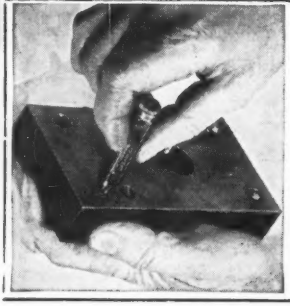
WHEN BUILDING DIES

This new method of checking tapers on dies does away with die squares and height gauges.

Write for complete details.

TIETZMANN TOOL CORP.

318 N. Main St., Englewood, Ohio



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.

The Heimann Transfer Screw Set is a self-contained complete tool. No wrenches or pliers are necessary. Made in $\frac{3}{16}$" to 1" diameters. *Send for price list.*

HEIMANN MFG. CO.

330 Lincoln Ave. Urbana, Ohio

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- HEAVY DUTY
- LONG LIFE
- HIGH SPEED

MARVECO is the time-tested live center with unlimited capacity—50 pounds to 50 tons . . . guaranteed to outperform and outlast any other live center. You can depend on MARVECO for trouble-free production.

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MARVEL TOOL & MACHINE CO.

1096 North River Road • St. Clair, Michigan

"BETTER MEASURE with LUFKIN"

SMASH HITS!

NEW! NEW! LUFKIN

MEZURALL and WIZARD JR.

TAPE-RULES with CHROME-CLAD BLADES

EASY TO READ MARKINGS THAT ARE DURABLE

Now you can get a famous *Lufkin Mezurall* or *Wizard, Jr.* steel Tape-Rule with *Chrome-Clad* non-glare blades . . . the most outstanding development in years! Get longer tape-rule life, more accurate measurement, a "better buy" in every way with either of these two *Newest of All Tape-Rules!*

CHECK THESE OUTSTANDING FEATURES:

1—Exclusive *Lufkin Chrome-Clad* satin finish blades.
2—Black markings stand out sharply against the chrome white background . . . and they're *durable*.
3—Rust and corrosion resistant.
4—Will not crack, chip, or peel.
5—Self-adjusting hook permits accurate butt-end and hook-over measuring.
6—Replaceable blades.
7—Smooth manual blade operation.
8—Improved heavily plated case—inset side plates in attractive red and white.

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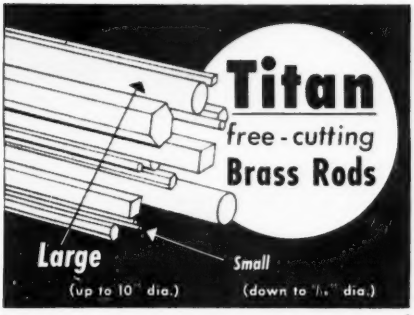
TAPES • RULES • PRECISION TOOLS

THE LUFKIN RULE CO. 75C

SAGINAW, MICH. • NEW YORK CITY • BARRIE, ONT.



- Furnished in all standard analyses
- Cast and Turned Rounds up to 10"
- Extruded and Drawn Rounds up to 4½"
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Write for folder: TITAN Large Diameter Rods

Titan

Metal Manufacturing Company

Bellefonte, Pennsylvania

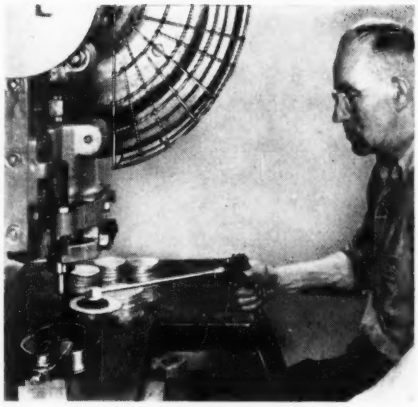
Representatives in Principal Cities

Quality Alloys by Brass Specialists
Brass and Bronze Rod . Forgings . Die Castings . Welding Rods

cludes a series of adjustable posts which allow for the accommodation of tools of different sizes and permit further adjustment as a tool becomes worn and is resharpened. The holder is available in two standard sizes for use on 9 to 16-inch lathes. Larger sizes can be readily made to meet special requirements.

Press Feeder

Known as the "Pres-Vac", a safety feeder for hand feeding small parts into a press has been announced by the F. J. Littell Machine Co. 4163 N. Ravenswood Ave., Chicago 13, Ill. The device, which produces a vacuum by passing compressed air through a venturi, is said to permit the operator to place small parts in position for stamping operations without putting his hands in the danger zone; namely, under the ram.



Pres-Vac Safety Feeder in use

DIE CASTING MACHINE

Low invesment cost makes DCMT most used in hardware industry!

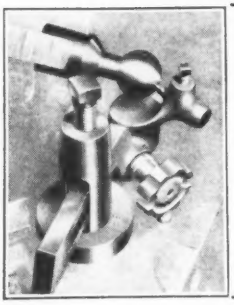
See it in operation at the ASTE Show in Philadelphia, Booth No. 412 and the American Foundrymen's Show in Cleveland, Booth No. 1619 or write to

DCMT Die Casting Machine Corp.
164 Duane St., New York 13, N. Y. Dep't M-4

MAKE 3 HAMMERS AT ONCE

Mold your own Lead Hammers on a PRODUCTION SCALE with a Shur-Grip Handle and Cook Production Mold. *Write for Circular.*
Vises, Hammer Molds, Handles

LAWRENCE H. COOK, INC.
67 Massasoit Ave. E. Providence 14, R. I.



Monarch Precision SHAPLANE Radius Tools
Illustration shows convex cutter for 1/4" to 2 1/2" balls.

FIVE MODELS for LATHES, SHAPERS, PLANERS, BORING MILLS

Range 1/2" to 3" for concave Radii. Also heavy duty models for radii to 6" on planers, etc.

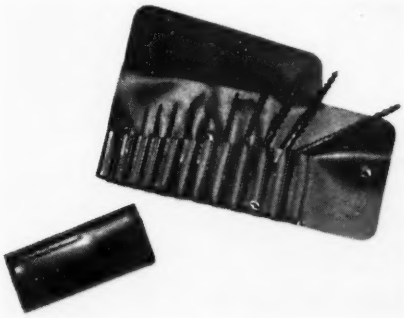
PATENT PENDING

Write for circular

C. B. TEETER, TOOL ROOM SPECIALTIES
4470 Oakenwald Ave., Chicago 15, Ill.

Plastic Kit for Reamers

Made of blue plastic, a handy kit for the protection of small reamers has been announced by The Gammons-Hoaglund

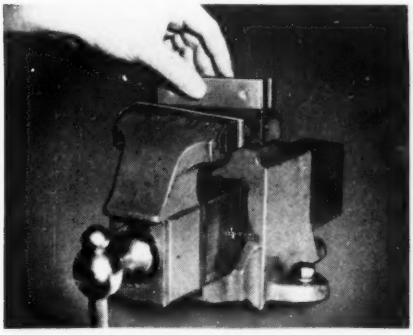


Gammons-Hoaglund Plastic Reamer Kit

Co., Manchester, Conn. The kit, which includes pockets for holding various sizes of reamers, is available upon request when reamers are purchased in sets of 12.

Vise Jaw

Of particular use to machinists and others handling delicate or finished products that require extreme appearance and workmanship, a vise jaw known as the "Clipper" has been announced by the Johnson Machine Works, 617 Menomnie St., Eau Claire, Wis. Designed to fit all standard vises from 3 to 6 inches, the jaw consists of a high carbon, heat-treated spring steel back with composition fiber face to prevent marring of delicate finish or plated surfaces.



"Clipper" Vise Jaws Being Applied to Vise

New BRADFORD 6" AERIAL GRINDER

- GRINDS,
- BRUSHES,
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All classes of work!

New heavy-duty Bradford *Metalmaster* 6" Aerial Grinder has excellent balance. Permits easy, accurate grinding on all classes of work, from ornamental iron to heavy "I" beams. Powerful AC-DC motor develops 1 h.p.; has no-load speed of 4000 r.p.m. Ball bearing construction. Wheel size is 6" x 1" with 5/8" arbor hole. Equipped with one general purpose grinding wheel; pressed steel wheel guard; 15 ft. of 3-wire, heavy-duty rubber cable and plug; two pole safety switch; eye bolt for counterbalance or suspension spring. Length, 25"; weight, 17 lbs. See your Bradford distributor. Also a complete line of bench and pedestal grinders and buffers; portable electric saws; drills; sanders; polishers. Write for information on our complete line.

THE BRADFORD MACHINE TOOL COMPANY

658 Evans St., Cincinnati, Ohio

Precision Since 1840

Insert Roll Marking Die Holder

The Parker Stamp Works, Inc., Hartford, Conn., has developed a rugged, accurate but simple insert roll marking die holder, known as the Parker 100 Series, which is machined and soft ground of a very tough alloy steel, then hardened throughout and finish ground on those surfaces which come in contact with the segment inserts when assembled. The inserts are likewise ground on those surfaces which must contact the holder. A taper-lock feature is said to assure positive locking and self-centering of any type combination in the longitudinal direction. Marking segments and type are made of a tough steel, scientifically heat-treated, and all characters are cut to rigid specifications and carefully inspected.

Parker 100 Series Insert Roll Marking Die Holder

The Parker 100 Series Insert Roll Marking Die Holder is made in a wide variety of sizes and can be used for marking either flat or round work on a marking machine, lathe, hand or power milling machine for long or short runs. A complete set of spacers is furnished with the holder thus making it possible to set up any desired type combination. Any of six different Parker standard type sizes 3/64 inch through ¼ inch can be used in the holder.

The holder may be used to stamp graduations on scales and rulers, mark wrenches, metal stampings, forgings, tools and many other items with trademarks, patent numbers, code numbers and so on. Marking segment inserts and type are Hyper-Honed for maximum production and sharp, clean impressions.

Announcing

ZIP-GRIP*

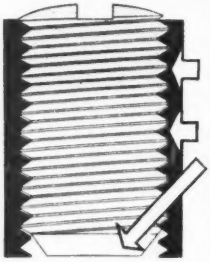
Self-Locking

SET SCREWS

and ADJUSTING SCREWS

LICK VIBRATION—LOCK INSTANTLY,

IN ANY GIVEN PLACE



First to have Triple-Locking Action:

1. INTERFERENCE FIT created by the larger pitch diameter of the locking thread section.

2. TENSION resulting from lifting action.

3. REGULAR SET SCREW LOCKING ACTION against the shaft or other part.

ZIP-GRIP is also the first Self-Locking Set Screw to lock without supplementary devices or deformed threads.

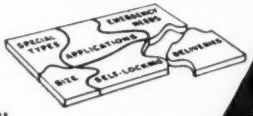
Write for new ZIP-GRIP Data Sheet giving detailed description and application data. Also send for complete Set Screw Catalog or write us about Special Set Screws, to suit your particular requirements; especially tough service or tricky applications.

MORE PROOF That We Specialize In Solving PUZZLING SET SCREW PROBLEMS

4017

Set Screw & Mfg. Co.

SETKO



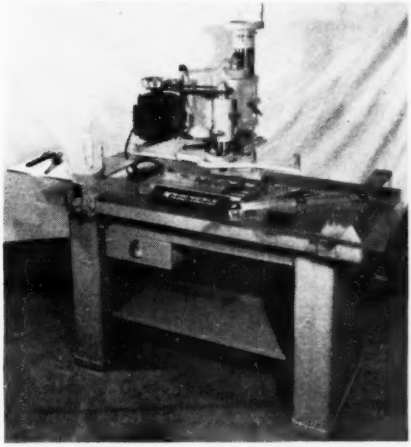
152 Main St., Bartlett, Ill.

* Pat. Pend.

Toolroom Machine

Known as the "Mill All," a pantograph controlled toolroom machine for use in performing machining, milling, routing, drilling, spot-facing, grinding, slotting, lapping, indexed milling and grinding operations on metals and other materials has been announced by Precision Industries, Inc., 15-R N. Cascade Ave., Colorado Springs, Colo. The machine is said to be generally adaptable for work on molds, die-casting dies, forging dies, instrument parts, machine parts, etc.

Said to be so simple that a comparatively inexperienced operator can produce quality work at high production speeds, the machine may be easily converted from a heavy duty model to a light model, or vice versa, depending upon its industrial applications by a simple change of attachments on the basic unit. The construction includes a 2 x 28 x 60-inch base table mounted on steel legs; extra heavy $\frac{5}{8}$-inch walled steel column; $\frac{1}{2}$ to $\frac{1}{4}$ h.p. 60-cycle 110 or 220-volt 1,725 r.p.m. motor; spindle drive seated in two ball bearing sets for the elimination of belt tension on the spindle; closed spindle and quill unit; pantograph; master table; subtable (furnished on heavy duty model only but adaptable to light model); dash pot (standard equipment on heavy duty model); and ratio setting slide (standard equipment on heavy duty model). The machine has a 22-inch reach from the column, 18-inch swing, and 9½-inch high clearance under the cutter.



"Mill All" Pantograph Controlled Toolroom Machine

COVEL
SAW SHARPENERS
HANCHETT
KNIFE GRINDERS
Straight or Cylinder Wheel Type with Either Mechanical or Hydraulic Control
HANCHETT
GK
KNIFE GRINDER
For finer, longer lasting cutting edges than you thought possible—by the most rugged machine in its range—up to 120" and longer!
● Write for complete data MMS-40
HANCHETT MANUFACTURING CO.
Main Office—Big Rapids, Mich. West Coast—Portland, Ore.
World's Largest Manufacturers of Saw Sharpening and Knife Grinding Machinery

New Films

Broach Film

A colorful, educational film starring "Big Boy," described as the world's largest broach, has been produced through the cooperation of the Detroit Broach Company, Commercial Steel Treating Corporation, Eaton Manufacturing Company, and Universal-Cyclops Steel Corporation. The film traces the life of Big Boy from the pouring of the steel for its forging through actual production use. Being in true color, it vividly illustrates the unique steel mill and heat treating operations.

The section of the film covering Big Boy in production use is particularly unusual since the broach is designed to remove 2¼ lb. of steel on every stroke. Big Boy was developed by Detroit Broach to produce the 44-tooth involute spline in bevel drive gears for an Eaton two-speed truck axle. It completely finishes the teeth in one stroke on a 72-inch horizontal broaching machine.

The film is 16 mm. with full sound track and has a showing time of 22 minutes. It is available to any interested group without charge from the Detroit Broach Co., 20201 Sherwood Ave., Detroit 34, Michigan.

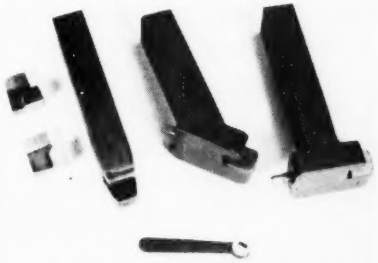
Concentrate on Something Else
One reason why we're still doing business successfully after forty-five years of manufacturing gears of all types for a variety of industries is because we have continuously maintained the policy of making sure that each customer gets exactly the right gear for the job. Since we expect to continue in business for a great many years, it stands to reason that this policy will never be compromised. Therefore, you can turn your gear problems over to us—while you concentrate on something else.
THE EARLE GEAR & MACHINE CO., 4707 Stenton Ave., Philadelphia 44, Pa. Sales Offices: New York City; Youngstown, Ohio.
EARLE GEARS
It's good business to do business with EARLE.

Safety Training Film

A training film designed to impress workers with the importance of wearing safety glasses has been announced by the National Safety Council, 20 N. Wacker Drive, Chicago 6, Ill. Titled "Easy on the Eyes," the film opens with an emotional appeal for workers to realize what their eyes mean to them, and illustrates how easily eyesight may be lost. The film shows what glasses are best for specific jobs and presents case histories of injured workers and the dramatic testimony of blind persons.

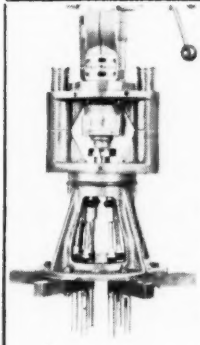
"Easy on the Eyes" is available in the usual 35 mm. sound slide film as well as in a new form for 16 mm. sound-motion projectors, which combines motion pictures, still photographs and unusual optical effects.

Improve Shop Practice With
INTERCHANGEABLE CARBIDE TIPPED TOOLS
Low Tool Cost Featured With
"APEX" TOOL HOLDERS AND BITS
All Standard Shapes carried in stock for machining Steel or Cast Iron.
Manufacturers of Inserted Tooth Milling Cutters, Round Shank or Shankless Tool Holders and Tool Bits.



You are invited to inspect these tools, Booth 5, ASTE Industrial Exposition, Philadelphia, Pa., April 10-14, 1950.

THE APEX TOOL & CUTTER CO. INC.
SHELTON, CONNECTICUT



NEW TAP or DRILL UNIT by THRIFTMASTER

Features . . .

1. Attaches to any drill press.
2. Automatic reverse for tapping.
3. Drills on same set up.
4. Spindles adjustable to infinite variety of patterns.
5. Increases drilling and tapping production 2 to 6 times proportionately . . . lowers cost.
6. Light or heavy duty up to 1" capacity—2 to 10 spindles.

ALSO COMPLETE LINE ADJUSTABLE AND FIXED CENTER DRILL HEADS

Subsidiary of Thomson Industries, Inc.

THRIFTMASTER PRODUCTS CORPORATION
1034 N. Plum St., Lancaster, Pa.
also Makers of
DORMAN AUTOMATIC REVERSE TAPPERS
4 Sizes • Friction & Positive Drives
Capacity 2-56 to 2" in Steel

TRUMORE DIAMOND TOOLS

cost less because they last longer. They carry only durable long-life Diamonds.

Gilmore
DIAMOND TOOLS

NO.45

Your grinding department should have a copy of our catalogue No. 45. It contains full information on Diamond Tools available for efficient wheel truing.

Write today for your copy.

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Book Reviews

How to Plan Pensions. By Carroll Boyce. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y. 479 pages. Cloth binding, board covers. Price, $5.06.

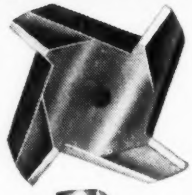
Intended to provide background information and to serve as a guide for the pension negotiator and others concerned with, or interesetd in, pension policy in business and industry, this book contains a concise, clear and simplified explanation of the workings of pensions. Step by step, it explains business and industrial pension systems, describes the cost factors involved, summarizes recent negotiated plans, digests the report of the presidential steel fact-finders, and in addition, includes several examples of typical pension plans.

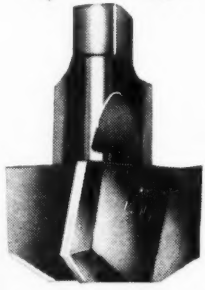
Lighting for Machining of Small Metal Parts. Published by Illuminating Engineering Society, 51 Madison Ave., New York 10, N. Y. 16 pages. Illustrated. Heavy paper covers. Price, 50 cents (quantity prices upon request).

Of particular interest to those concerned with proper seeing conditions in metal-working plants, including maintenance engineers, utility company lighting departments, and industrial lighting equipment manufacturers, this report presents illumination recommendations for some of the major and most exacting lighting problems. The report recommends lighting for operations from general and supplementary lighting through lighting for specific tasks, with special attention in the latter section to measuring instruments and rules and graduated feed indicating scales. Other sections prescribe illumination for bench work and inspection, in addition to lighting for precision type lathes, internal and external grinders, shapers, and drill presses.

100% MORE FEED
when enlarging holes with . . .

S-J SCULLY-JONES *New*
CORE DRILL CUTTER





100% more feed because four flutes are cutting instead of two. Also, this New Cutter removes approximately 45% of its diameter. Result—less time per operation.

Cut tooling costs on set-ups for enlarging holes, where guide bushings are not used. Only 4 Drivers are required for the 25 S-J Core Drill Cutters.

Rigidity is assured by the short body of the Driver. This eliminates one of the causes of chatter.

Use these S-J four-fluted Core Drill Cutters and Drivers

- radial drills
- engine lathes
- turret lathes
- boring mills
- and similar machines

SEND FOR NEW DESCRIPTIVE BULLETIN containing prices and specifications.

Scully-Jones AND COMPANY

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YOU GET LOW COST, FAST, ACCURATE PRODUCTION WITH OUR STANDARD AND SPECIAL TOOLS

New Shop Literature

The publications listed in this section may be obtained free upon written request on company letterhead to the manufacturers concerned. Your courtesy in mentioning MODERN MACHINE SHOP when requesting copies of these publications will be sincerely appreciated by the manufacturer and the publisher of this magazine.

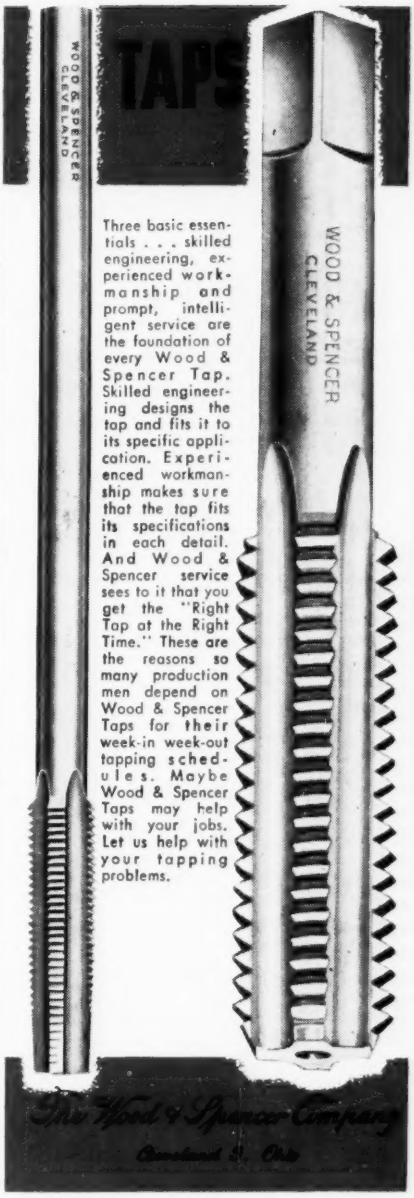
Woodruff Keys. A four-page catalog issued by the John Gillen Co., Inc., 2542 S. 50th Ave., Cicero 50, Ill., contains data on prices and sizes, as well as illustrations, of standard Woodruff keys.

Machine Vise with 8-inch wide jaws and maximum jaw opening of 11 inches for use on milling machines, drill presses, and shapers is illustrated and described in a two-color circular available from the Ames Precision Machine Works, Waltham 54, Massachusetts.

Convex Cutter. C. B. Teeter, 4470 Oakenwald Ave., Chicago 15, Ill., has available a circular illustrating and describing the Monarch "Shaplane" Convex Cutter, a heavy duty alloy steel tool for cutting a 2½ to 6-inch radius using a ¾ x 1-inch tool bit.

Tool Specialties. A 32-page catalog (No. 150) describing an enlarged line of machine handles, levers, cranks, handwheels, threaded plastic balls, cast iron knobs, and other tool specialties has been issued by the Reid Tool Supply Co., 709 Baker St., Muskegon Heights, Mich. Sufficient technical and dimensional data are included to make the catalog a handy reference source on machine and tool design applications.

Broaches. A 36-page plastic-bound three-color catalog (No. 450) containing complete information on all of the various types of broaches manufactured by the American Broach & Machine Co., Ann Arbor, Mich., is now available from this firm. The catalog is divided into two sections, the first of which contains blueprints and photographs of internal and surface broaches, broach holders, and pull-and-push broach connecting heads. The second section illustrates the various broaches in use on internal and surface broaching operations.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Three basic essentials . . . skilled engineering, experienced workmanship and prompt, intelligent service are the foundation of every Wood & Spencer Tap. Skilled engineering designs the tap and fits it to its specific application. Experienced workmanship makes sure that the tap fits its specifications in each detail. And Wood & Spencer service sees to it that you get the "Right Tap at the Right Time." These are the reasons so many production men depend on Wood & Spencer Taps for their week-in week-out tapping schedules. Maybe Wood & Spencer Taps may help with your jobs. Let us help with your tapping problems.
The Wood & Spencer Company
Cleveland 4, Ohio

Carbide and Cast Alloy Products. The Vascoloy-Ramet Corp., 800 Market St., Waukegan, Ill., has published a 92-page two-color plastic-bound catalog (VR-440) on carbide and cast alloy products. Visually indexed and color tabbed for easy reference, the catalog, primarily designed as a complete buyer's guide, contains sufficient information to warrant its use as a standard book of reference for the carbide industry. A partial list of products displayed includes carbide tools, blanks, wire drawing dies, drills, end mills, blades, Tantung castings, vertical and horizontal toolholders, and inserts.

Diamond Compound for cutting, lapping, and polishing carbide products, plastic molds, cylindrical and flat gages, high speed steel tools, dies, punches, rolls, instrument parts, and so on, is discussed in a four-page two-color illustrated folder issued by J. K. Smit & Sons, Inc., Murray Hill, New Jersey.

Gear Hobbers. A 28-page bulletin (No. 233) published by Gould & Eberhardt, Inc., Irvington 11, N. J., covers a line of universal manufacturing gear hobbing machines for the accurate, rapid, and economical production of large and small quantities of spur gears, single and double-helical gears, worm gears, worms, spline shafts, ratchets, and sprockets. Complete specifications, descriptions, and illustrations of the machine and various attachments are supplemented by illustrated production examples.

Surface Roughness Measurement. The Physicists Research Co., Ann Arbor, Mich., has published a four-page, two-color bulletin illustrating and explaining the practical operating features of the Profilometer, a shop instrument for measuring roughness in microinch units (millionths of an inch) and which is recommended for use throughout all industries where surfaces are produced by machining, grinding, and many other sizing and finishing operations.

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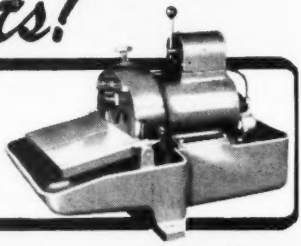
Cuts Costs!



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—designed especially for grinding or lapping carbide. Has special reversible 1 HP motor, 12 gal./hr. coolant pump, easily adjustable table, swiveling wheel guard.

STEEL-BONDED DIAMOND WHEELS

—practically indestructible with extra long life. Diamond particles stay in place until completely worn. Finish tools better for longer tool life.

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—with many times the service life of other chip-breaker diamond wheels. Reduce wheel and tool costs materially and speed grinding 3-4 times.

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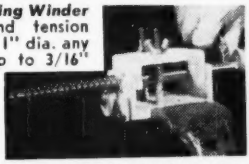
With the JV Spring Winder
Compression and tension springs 1/16" to 1" dia. any length, using up to 3/16" wire, all coils perfectly spaced.



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Sample $1.00 p.p.

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Right *now*. We can *cut your costs* up to 30%. How? WRITE TODAY!

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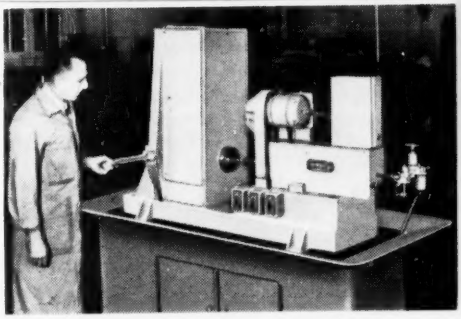

which makes possible automatic drilling of round piece parts, accurately concentric to .001" - .004".

• This machine consists of a stand with a built-in Coolant tank and pump, a Machine-bed, a variable speed lathe head (lathe speeds from 200-3000 rpm.), and an Auto Drill Unit with attachment for controlled pulsating drill action, incorporating rotary and reciprocal motions and adjustable as to speed, depth, and dwell.

• This combination does more than simplify the operation of several Machines to one. It fills a hitherto-unfilled need. The simultaneous action of these two operations in one machine makes possible a precision and speed never equalled before, which results in drastic reduction of material waste and a saving of costly production hours.

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Each Auto-Drill can be made with special attachments to meet your exacting requirements for greatest efficiency.
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O-Ring Hydraulic Packings are fully covered in a 16-page catalog (No. 9-A) distributed by the Minnesota Rubber & Gasket Co., 3630 Wooddale Ave., Minneapolis 16, Minnesota.

Wet Tool Grinder, which employs a simple self-adjusting friction roll drive and is said to be ideal for sharpening edged tools and cutlery, is illustrated and described in a six-page two-color folder published by the Boice-Crane Co., 937 Central Ave., Toledo 6, Ohio.

Guide Bushings. A four-page two-color bulletin and price list (No. B-1) on hardened steel bushings with bronze plated bearing surfaces for use with all types of guide pins is now available from Lamina Dies & Tools, Inc., 14925 W. Eleven Mile Rd., Berkley, Michigan.

Drive Pin. A 16-page catalog published by The Driv-Lok Pin Co., Sycamore, Ill., explains and illustrates the many uses of the Driv-Lok Pin designed for the easy assembly of collars and shafts, gears and shafts, and other parts; locating or aligning machine components; and for use as a hinge or pivot pin, linkage or knuckle pin, roller end, and so on. In addition to complete listings of standard types of pins, the catalog also deals with special types of pins.

Miniature Ball Bearings. A 12-page technical bulletin (No. 50) issued by New Hampshire Ball Bearings, Inc., Peterborough 1, N. H., illustrates and describes a complete line of standard and special miniature type ball bearings, including Conrad radial, full face radial, extra light radial, angular contact, self-aligning and pivot bearings in outside diameters from ⅛ to ⅜ inch. Data on tolerances, loads, speeds, life, lubrication, mounting, fits, and so on, are included. For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

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Everything you want in CYLINDERS
Here's help for busy machine designers and plant operating engineers. You can save time and money right from the start by checking with Hannifin on all of your hydraulic and pneumatic cylinder requirements. The Hannifin line is complete!
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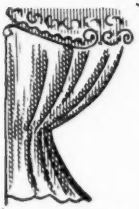
Bulletin 110 (Left) "HANNIFIN HYDRAULIC CYLINDERS"
Bulletin 210 (Right) "HANNIFIN PNEUMATIC CYLINDERS"



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AIR OPERATED DIAL FEED TABLES

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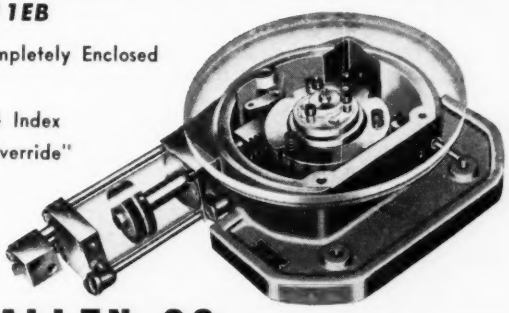

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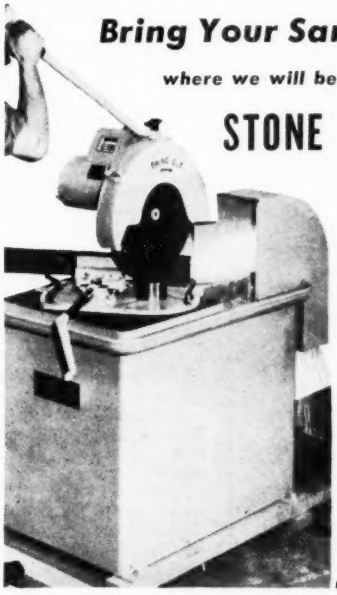

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In Ferrous and Non-Ferrous Metals

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Cuts any metal in seconds.

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Cuts any angle from straight to 46° in quick change, self centering vise.

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Offers you much more cutting capacity per dollar than any other abrasive cut-off machine.

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STONE MACHINERY CO., INC.

403 Fayette St. Manlius, N. Y.

Deferred Payment Plan. How Bliss power presses may be purchased under the company's recently announced deferred payment plan is explained in detail in a four-page booklet released by the E. W. Bliss Co., Toledo 7, Ohio.

Electrodes. A 16-page catalog (No. EW-149) announced by the Hobart Brothers Co., Troy, Ohio, contains data on the application, mechanical properties, specifications, and so on, of electrodes for a wide variety of operations.

Descaling and Cleaning Attachment, designed for use with the Steen Cut-Off Machine and said to be ideal for removing scale, rust, concrete, old paint, and so on, from pipes and tubes, is illustrated and described in a two-color bulletin available from the Continental Machine Co., 1952 Maud Ave., Chicago 14, Illinois.

Milling Machine. A four-page two-color bulletin (No. 50) published by the Index Machine Co., Dept. MMS, 543 N. Mechanic St., Jackson, Mich., explains, and provides specifications of, its Model 50 Index Milling Machine which has a capacity for ⅛ to 1-inch end mills in tool steel and features a right-angle milling head for right angle end milling, horizontal milling, and drilling or boring operations.

"Installation, Maintenance, Removal of Anti-Friction Bearings" is the title of a 20-page booklet published by the Anti-Friction Bearing Distributors' Association, 1900 Euclid Bldg., Cleveland 15, Ohio. Compiled as a service to plant supervisors, maintenance men, and others responsible for maintenance of equipment containing anti-friction bearings, the booklet is profusely illustrated throughout and provides detailed information on the subjects of Bearing types, cleaning Bearings, Removing Bearings, Installation, and Lubrication, as well as tips on how to handle and prepare bearings for storage.

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For clamping when space is limited

Equipped with various spindle types—steel or copper, or rubber capped

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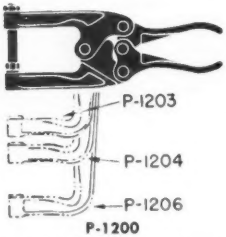
Spindle automatically adjusts itself to total thickness of materials held



P-1200

Available in 4 standard throat gaps—1 9/32", 2 11/16", 3½" and 6"

Whether you clamp tiny parts requiring pressures of a few pounds or want to hold together huge assemblies that need pressures of around 1800 pounds, Knu-Vise Toggle-action pliers will provide the dependable service you need.

Made to most exacting specifications resulting from exhaustive laboratory tests and years of practical use among leading industries.

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Glendale, Calif., Art Lewis Prod. Equip. Co.
Houston, Texas, L. H. Creasy
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Milwaukee 9, Wisconsin, K. W. Stoffregen
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Seattle, Washington, Norwes Company
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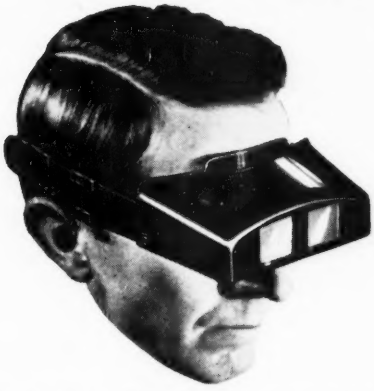
People work better when they SEE BETTER



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Metal Piping and Valve Identification Tags, available in 26 shapes either embossed or stamped, are illustrated and described in a four-page attractively printed folder available from Jas. H. Matthews & Co., 3942 Forbes St., Pittsburgh 13, Pennsylvania.

Lock Nuts. The Palnut Co., 61 Cordier St., Irvington 11, N. J., has released a four-page two-color folder on lock nuts which features two interesting and revealing case histories.

Grinders and Buffers. Bulletin 7-14 available from The Hisey-Wolf Machine Co., Cincinnati 8, Ohio, illustrates and describes bench and pedestal grinders, buffers and polishers, as well as dust collecting equipment for use with same. Complete specifications of the various equipment, together with prices, are conveniently tabulated.

Socket Screws. A 16-page bulletin (Form No. 490) released by the Parker-Kalon Corp., 200 Varick St., New York 14, N. Y., contains engineering data on the various types of socket screws, both high tensile alloy and stainless steel, together with a complete list of standard sizes for each type, Stripper bolts, pipe plugs, and hex keys are treated in the same systematic fashion. Several pages are devoted to a pictorial record of Parker-Kalon quality control.

Rotary Files. A four-page two-color bulletin (No. RF-50) illustrating, listing, and describing a complete line of rotary files and ground cutters for use with flexible shaft machines and other portable tools is now available from the R. G. Haskins Co., 2647 W. Harrison St., Chicago 12, Ill. Featured is the "Fifty - to - One File," a carbide rotary file which is designed to allow for the use of high cutting speeds and provide for long life with a minimum of sharpenings.

NEW tapping head SLASHES COSTS on large hole tap jobs!

- **Production increased as much as 100%**
- **Drastic reduction in spoilage**
- **Greatly increased tap life**

This new "TAP KING" tap head is revolutionizing methods . . . *cutting production costs* on difficult large hole tapping jobs. Daily *production gains* have *run as high as 50-100%!* Users report savings in parts spoilage, accurate maintenance of uniform tap depth . . . even on large *blind hole* tapping jobs!

Features include: Capacity of ⅜" to 1" in steel and 1⅛" in softer materials; powerful friction clutch; exclusive spline drive; helical back gear reversing mechanism; aluminum housing and many other advantages.

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Gentlemen: Please send me full details on the new Procunier "TAP KING."
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NEW! LARGER! Procunier "TRU-GRIP" Tap Saver

Small size makes tapping easier close to walls or shoulders. It drives the tap by the square, holds it true by the round.

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Dial Feed Tables. A four-page two-color bulletin published by The A. K. Allen Co., 495 Wythe Ave., Brooklyn 11, N. Y., describes and illustrates its improved Models 11EA and 11EB Dial Feed Tables for high-speed machinery. Data on specifications and prices are included.

Magnetic Holder for test indicators and Handi-Lites is illustrated and described in Bulletin No. 600 available from the Enco Mfg. Co., Dept. 1129, 4524 Fullerton Ave., Chicago 39, Illinois.

Universal Wear Tester. A four-page folder now available from Custom Scientific Instruments, Inc., P. O. Box 170, Arlington, N. J., illustrates and describes a multi-purpose and semi-automatic instrument designed for quantitatively measuring resistance to flat abrasion, edge abrasion, and flex abrasion of fabrics, coated fabrics, plastic film, and like materials and the resistances to flat and edge abrasion of felts, laminated fabrics, and solid plastic materials.

Bronze Maintenance Bars and Bronze Bearings. A handy pocket-size catalog (No. 480) listing fully machined maintenance bars, solid maintenance bars, and standard sleeve type bearings is now being offered by the Buckeye Brass Mfg. Co., 6410 Hawthorne Ave., Cleveland 3, Ohio. Measuring approximately 5 x 7 inches, the catalog, with easy to use cut-out index, provides a handy reference guide that can easily be carried in a coat pocket.

Automatic Gear-Hobbing Machine. The George Scherr Co., Inc., 198-A Lafayette St., New York 12, N. Y., has available a six-page bulletin on an automatic gear-hobbing machine for small gears and pinions up to 2 inches in diameter. Complete specifications are listed.

Milling Cutters. McCroskey Tool Corp., Meadville, Pa., has published a 36-page bulletin (No. 17-M) on its "Jack-Lock" milling cutters which are available with carbide tipped, cast alloy, or high speed steel blades. Data on cutters for cast iron, aluminum, and steel are provided. In addition, the bulletin includes information on recommended feeds, speeds, and grinds, as well as other helpful material.

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DISTINCTIVE MARKS made on any clean metal or carbide in seconds — NO ACIDS, NO BURRS — NO DEFORMATION. No Artistic Skill required. Stencils may be made in your plant.

A demonstration in your plant will surprise you.

The LECTROETCH Co.

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Workbenches. The Standard Pressed Steel Co., Jenkintown 22, Pa., has published a bulletin (No. 701) on Hallowell Workbenches. Information and illustrations as to the construction, sizes, models, parts and accessories of the benches are included.

Soldering Flux, Bulletin 18 now being distributed by Handy & Harman, 82 Fulton St., New York 7, N. Y., describes a liquid flux developed especially for use in gold and silver soldering operations.

Arc Welding Machines. A 36-page illustrated catalog covering all arc welding machines in the Airco lines has been announced by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. The catalog is divided into two parts, one dealing with a.c. arc welders and the other with d.c. machines.

Socket Head Cap Screws and Stripper Bolts. Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill., has released a four-page, two-color bulletin on knurled socket head cap screws and stripper bolts which minimize wrench tightening, provide ease in driving into awkward locations, and permit compact assembly. List price and specification charts are also included.

"Multiple Rotary Slitting Lines" is the title of a 76-page three-color catalog published by The Yoder Co., Dept. 5532, Cleveland 2, Ohio, which traces the evolution of multiple rotary slitters and explains basic considerations in selection of equipment. Part I of the catalog includes basic information on design, selection and operation of slitters and slitting lines, including time studies and analysis of operating cycle, discussion of coil handling and scrap disposal methods. Part II is dedicated to specifications, capacity tables and other data on Yoder standardized series of uncoilers, slitters, recoilers, coil cars and scrap choppers.

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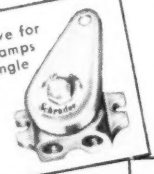

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The clinic is designed to acquaint the sales or service engineer, manufacturer's agent, tool or accessory salesman with the equipment used by the manufacturer buying his products. The program will be conducted as a "shop clothes" clinic to enable students to acquire the know-how necessary in promoting good customer relationships.

The staff will be composed of representatives of the machine tool builders and equipment manufacturers and members of the RIT faculty. The following RIT laboratories will be at the disposal of the clinic: automatic screw machine; machine shop; quality control; "strength of materials" lab; metallurgical and heat treating laboratories. A series of demonstrations and on-the-spot discussions and laboratory periods are scheduled from 8:30 a.m. to 5 p.m. each day of the clinic.

Tuition, which includes all course materials and a special dinner meeting for participants, is $100. Inquiries should be addressed to Alfred L. Davis, Associate Director, Evening and Extention Division, RIT, Rochester 8, New York.

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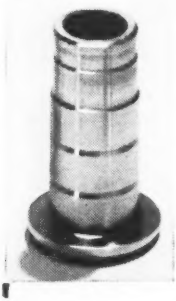

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Small Motor Selection. A four-page booklet on small motor selection is now available from the Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. The first page of the booklet is devoted to explaining why there are different types of fractional horsepower motors and the factors to be considered in selecting the right motor for the application. The center pages, which open to form a large chart, present in tabular form the various types of small motors, together with complete data concerning horsepower range, speed characteristics, torque, reversibility, bearings, mountings, and application. Typical speed-torque curves for various types of fractional horsepower motors are included, together with information on specialized standard designs for specific applications. Copy free upon request.

Automatic Polishing and Buffing Machines. Hammond Machinery Builders, Inc., 1621 Douglas Ave., Kalamazoo, Mich., has released an eight-page catalog (No. 50) illustrating and describing Hammond Super Model K-46-6 Indexing Rotary Automatic Finishing Machines which are designed to handle comparatively large work such as small frames for automobile instrument panels, automotive accessories, builders' hardware, plumbing fixtures, electric appliances, household appliances, utensils, and pots and pans, as well as many different operations on plastics. The catalog also describes the smaller J Series Indexing and Continuous Rotaries, Strait-Line Automatics, and various types of abrasive belt and wheel type heads for diversified grinding, polishing, buffing, or deburring operations. Copy free.

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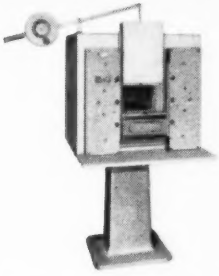

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Over The Editor's Desk

The Tool Engineers

IT is a foregone conclusion that during the week of April 10 the attention of the entire metal-working industry will be focussed upon the Eighteenth Annual Convention and Seventh Industrial Exposition of the American Society of Tool Engineers. The reasons are many, but one stands out more significantly than all the rest, and that one reason, we believe, is the keen interest in the theme of the meeting—"cost-cutting."

Now, more than ever before, operators of manufacturing plants across the nation are searching for ways in which they might reduce manufacturing costs. With material and labor costs at peak levels and with no indication that there will be any significant decrease in these costs in the near future management is looking more and more to the tool engineer to provide the answer to the problem. The manner in which tool engineers have accepted this responsibility will be revealed at the Philadelphia meeting.

The Exposition will offer a tremendous array of the newest and most efficient tools and machines as well as educational presentations of the latest processes. Engineers, technicians and industrialists will have an opportunity to observe tools and processes in actual operation and to discuss their merits and advantages with the builders.

The visitor will have the opportunity to hear outstanding experts in the various branches of his specialized field of engineering. A considerable amount of discussion will be centered around "Automation," the word which has been coined to describe the process of converting to automatic operation something previously done by hand, with the twin objectives of reducing cost and reducing the amount of physical labor required from a worker.

Thus, we could continue to enumerate the many interesting things in store for the visitor to this outstanding Convention and Exposition. Suffice it to say, those who attend are assured of a full measure of cost-cutting ideas.

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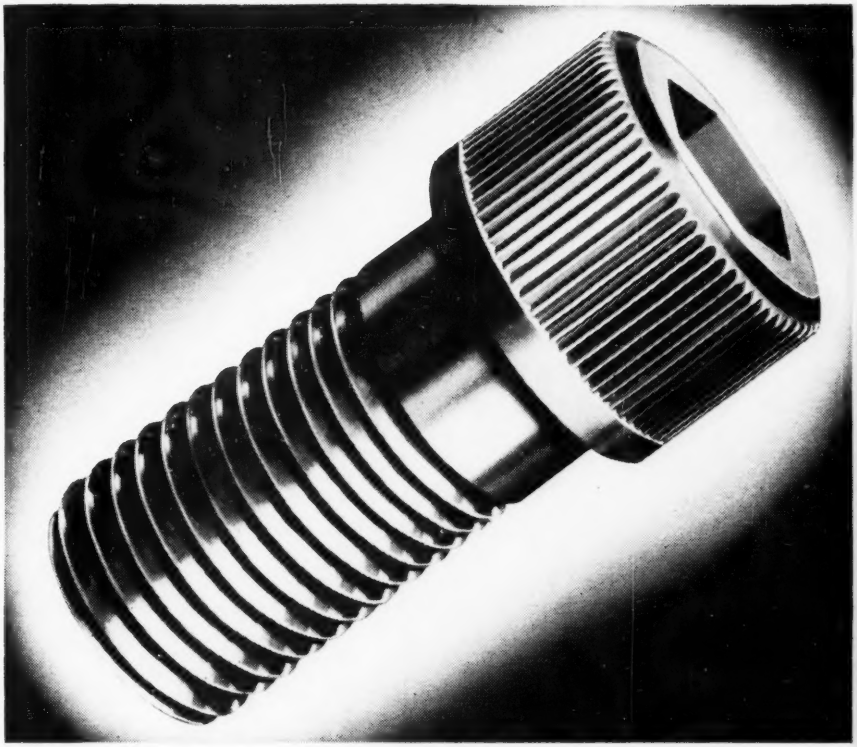

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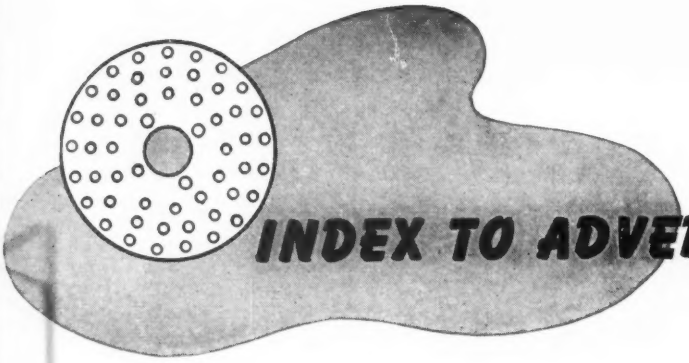

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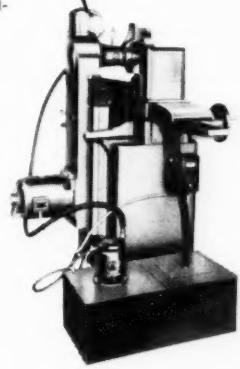

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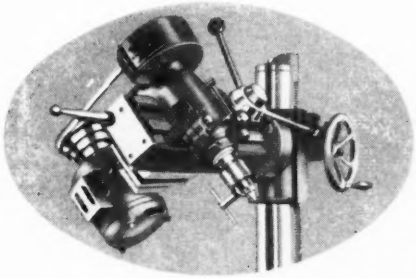

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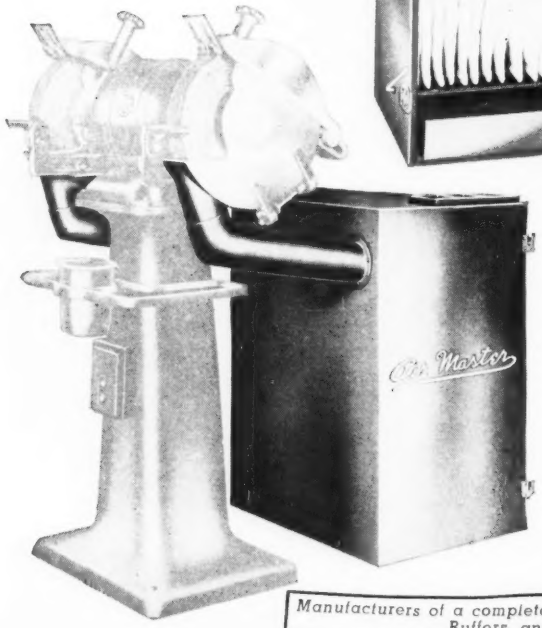

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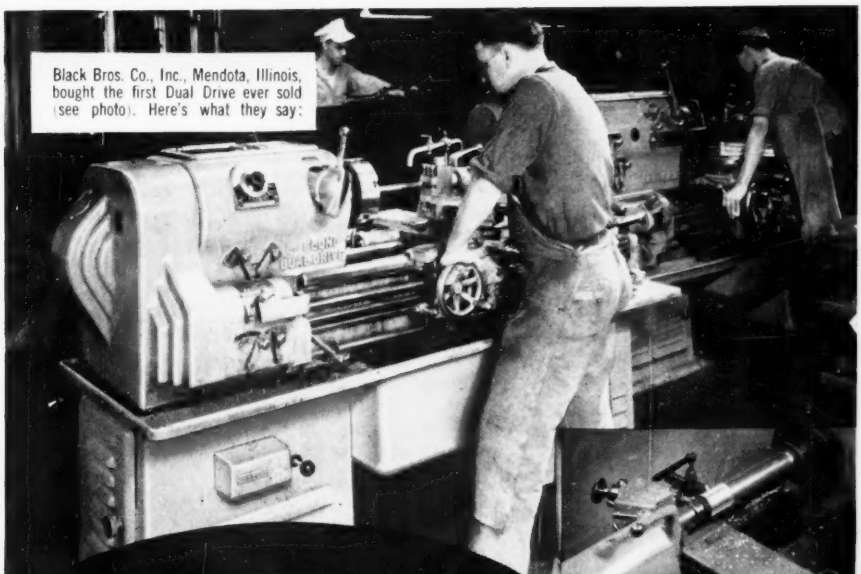

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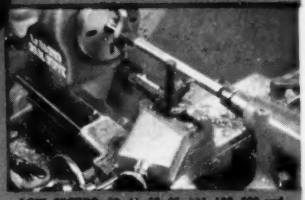
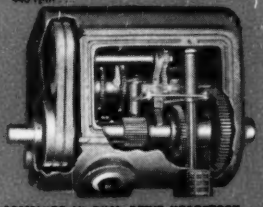
SALES OFFICES: New York, Chicago, Detroit

CARRIED SPEEDS: 540, 782, 1140 and 1800 rpm...

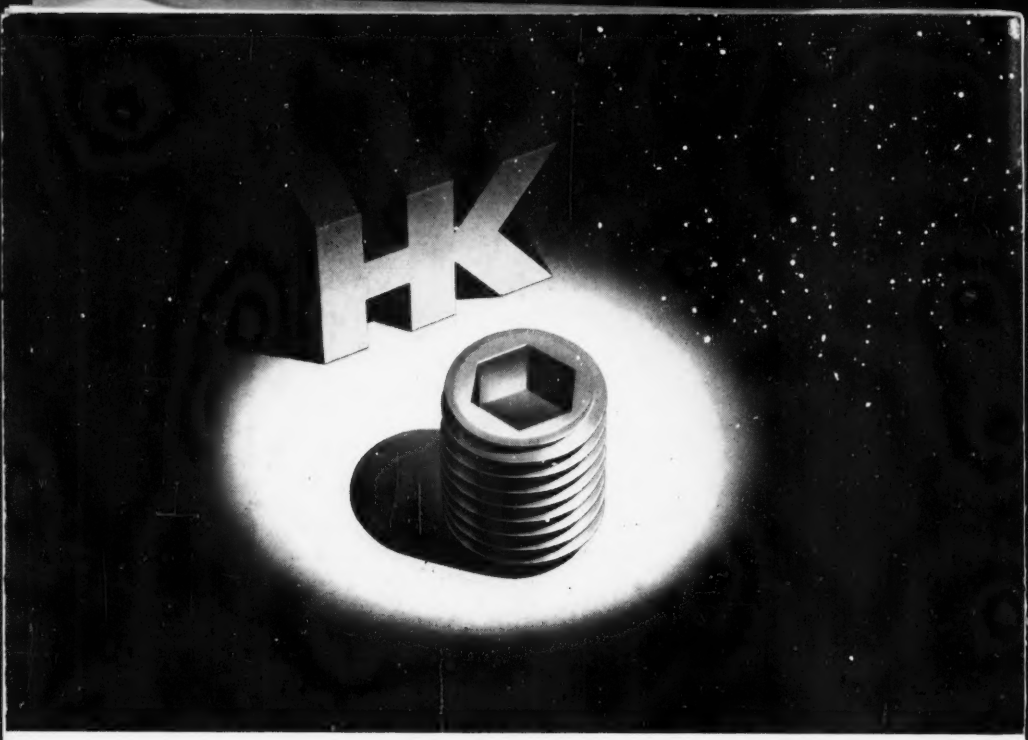


LOW SPEEDS: 28, 41, 60, 85, 124, 193, 282 and 445 rpm



COMBINED IN DUAL DRIVE HEADSTOCK

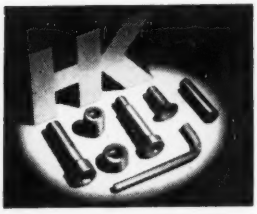
LeBLOND



. . . the screw that's set for life!

Holo-Krome Socket Set Screws, or safety set screws, are accepted and promoted by industry as the quality screws that can be set for life and counted on to do the job. They are set up in the most difficult places and forgotten. This confidence in Holo-Krome set screws was earned the hard way — through superlative performance in countless applications. It's no surprise because Holo-Krome's *only* business is to make the finest screws . . . better.

Holo-Krome Socket Set Screws are set for life with industry, too, because they are the screws Completely Cold Forged— the patented method which improves on the natural strength of steel. In Holo-Krome screws the fibres of the HK special analysis heat treated alloy steel are laterally deflected to form the base of the socket. They are compacted to concentrate strength in the vital parts of the screw. In short, the fibres continue from top to bottom of the screw in an unbroken pattern, with no shearing, no tearing. STRENGTH? . . . ask the men who use Holo-Krome.



HOLO-KROME

Completely Cold Forged Socket Screw Products

THE HOLO-KROME SCREW CORP., HARTFORD 10, CONN.